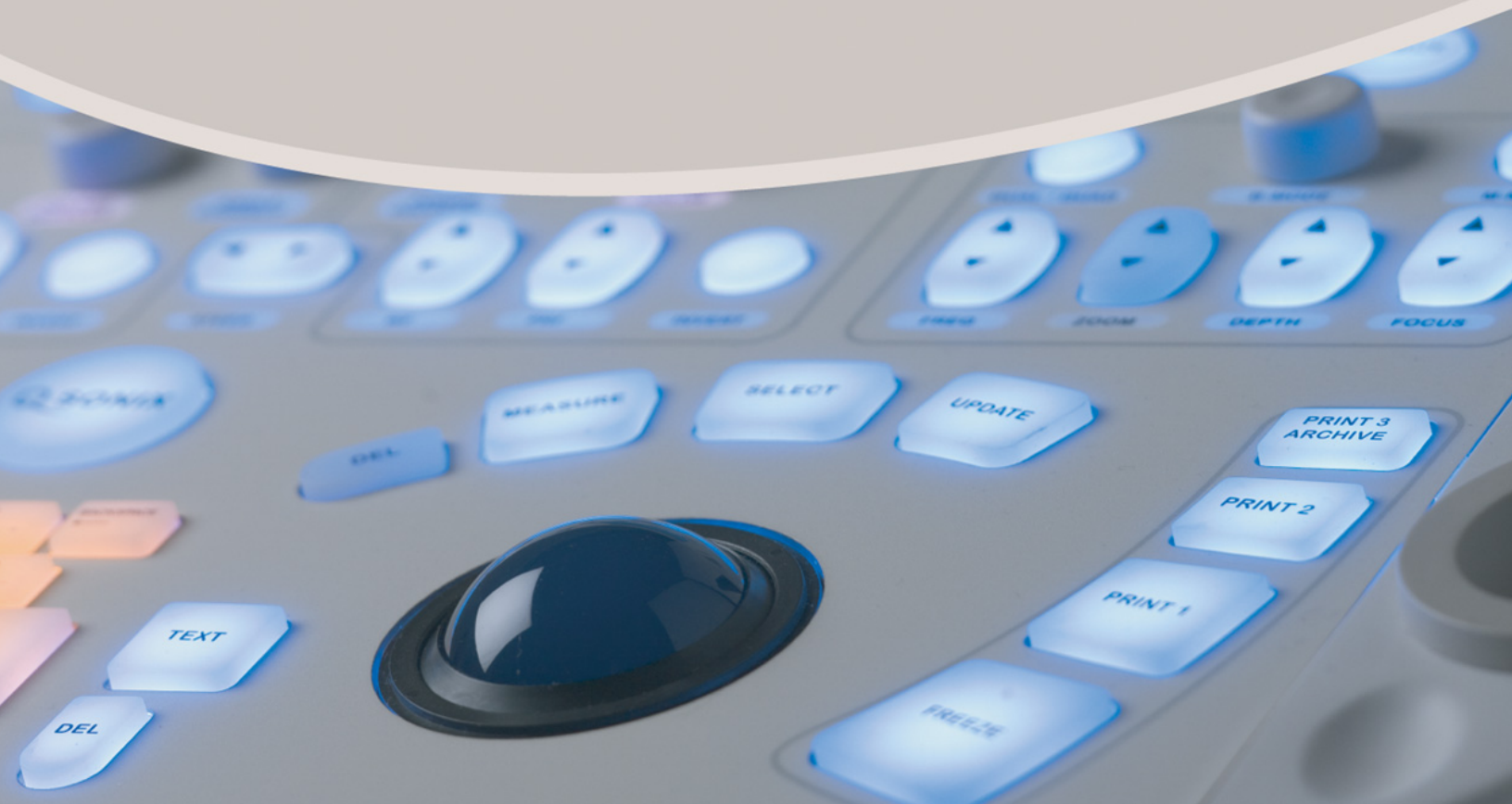
ULTRASONIX

SONIX SERIES ULTRASOUND SYSTEM SERVICE MANUAL



Ultrasonix Medical Corporation

SONIX Service Manual

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CHAPTER 1: GENERAL INFORMATION

1.1 AUDIENCE

The intended audience of this service manual is properly trained field and in-house service personnel. The SONIX Ultrasound System is a medical device containing several circuit boards, extensive service diagnostics, and complex operating software. For these reasons, Ultrasonix recommends that only trained certified technical support representatives service this ultrasound system.

1.2 LICENSE AGREEMENT

All SONIX computer programs have been patented by Ultrasonix Medical Corporation (Ultrasonix). Such programs are licensed under the following software license agreement:

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Ultrasonix SONIX systems are protected under US patents 6,911,008 - 6,558,326 - 6,325,759.

Windows® is a trademark of Microsoft Corporation.

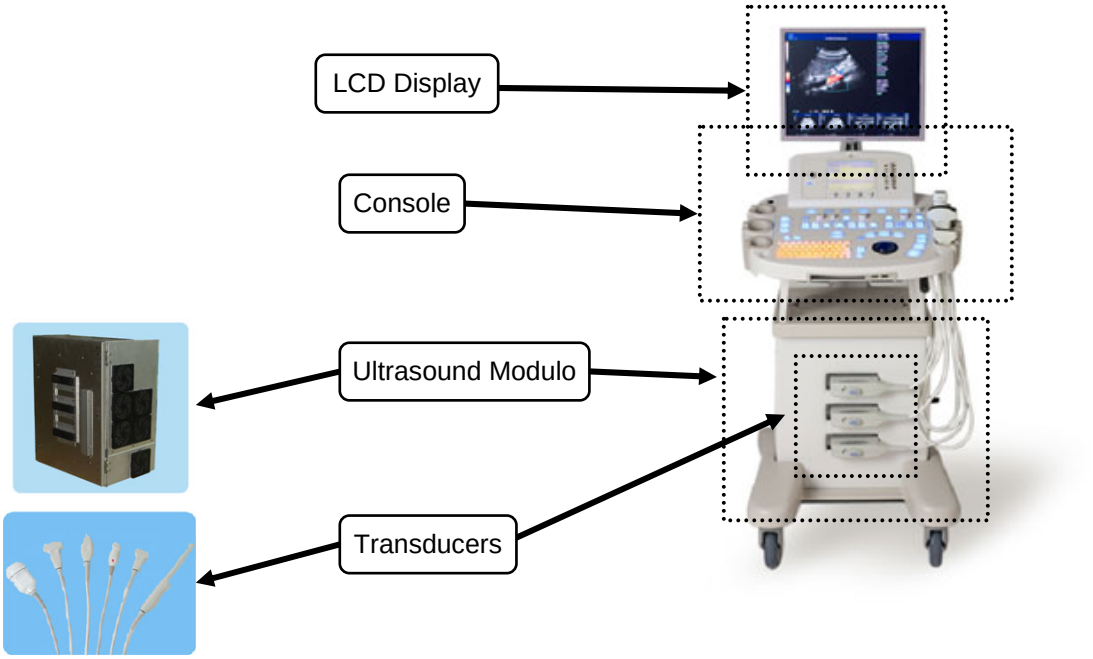
DICOM® is the registered trademark of the National Electrical Manufacturers Association (NEMA) for its standards publications relating to digital communications of medical information.

1.4 INTRODUCTION

The SONIX Ultrasound System is a software driven, ergonomic, diagnostic medical device. The SONIX uses state of the art technologies to acquire, process, and display ultrasound data (see **Figure 1-1**).

The system has four field serviceable components: LCD Display, Console, Ultrasound Modulo, and Transducers.

Figure 1-1: SONIX Ultrasound System



1.5 PHYSICAL DESCRIPTION

1.5.1 LCD Display

The monitor is an EIZO Liquid Crystal Display. Operating resolution is 1024x768 pixels @ 60Hz. The LCD display is mounted on an adjustable vertical arm, giving the user the comfort of use.

1.5.2 Console

The Console incorporates a sleek yet conservative design with easy to reach function controls. The Console controls consist of a keyboard, trackball, an array of push buttons, sliders, rotary encoder, and toggle switches. The Console is mounted on an adjustable and ergonomic support allowing for greater freedom and comfort.

1.5.3 Ultrasound Modulo

The Ultrasound Modulo is the heart of the system. All the system boards and electronics are encased in an aircraft grade aluminum composite case for ease of service.

1.5.4 Transducers

Ultrasonix offers a wide selection of high performance transducers for a variety of imaging applications. Incorporating the latest acoustic materials and technology, Ultrasonix's lightweight transducers are ergonomic and durable for maximum clinical use.

CHAPTER 2: SYSTEM SPECIFICATIONS

2.1 DIMENSION

Table 2-1: System Dimensions

Measurement	Metric Value	US Value
Width	53.34 cm	21.0 in
Depth	60.96 cm	24.0 in
Height	144.78 cm	57.0 in
Weight	54.55 kg	120 lbs

2.2 SYSTEM ARCHITECTURE

- 256 channel fully digital broadband beamformer
- Beam steering for increased sector size on all transducers
- Multi-Vector processing or resolution enhancement
- Powerful single processor microcomputer.

2.3 IMAGING MODES

- B Mode
- Dual B Mode
- Quad B Mode
- BM Mode
- Color Flow Mapping Doppler
- Trapezoidal Imaging (linear transducers)
- Comp Real-time spatial compound imaging
- Tissue Harmonic Imaging (THI)
- Power Doppler (Angio)
- Pulsed Wave Doppler (mono and duplex)
- Continuous Wave Doppler
- Panoramic Imaging
- 3D*
- 4D*
- Extended Field of View*

2.4 CLINICAL APPLICATIONS

- Abdominal
- Vascular
- Breast
- Obstetrical
- Cardiac
- Prostate
- Gynecological
- Musculoskeletal

2.5 TRANSDUCERS

- 4DC6-3/40 broadband (3.5 MHz) 40mm 3D Abdominal
- 4DC7-3/40 broadband (5 MHz) 40mm 3D Abdominal
- C5-2/60 broadband (3.2 MHz) 60mm curved array
- C7-3/50 broadband (6 MHz) 50mm curved array
- EC9-5/10 broadband (6.6 MHz) 10mm endocavity array
- L14-5/38 broadband (8 MHz) 38mm linear array
- L14-5W/60 broadband (8 MHz) 60mm linear array
- PA4-2/20 broadband (2.8 MHz) N/A phased array

2.6 IMAGE PARAMETER ADJUSTMENTS

2.6.1 B Mode

- Gain
- TGC
- Focus
- Dynamic Range
- Color Maps
- Line Density
- Sector Size
- Steer
- Acoustic Power
- Wide Sector
- Zoom

2.6.2 M Mode

- Sweep Speed
- Sample Volume

2.6.3 Pulsed Wave Doppler

- Doppler Gain
- Doppler Frequency
- Wall Filter
- Sample Volume Angle
- Pulse Repetition Frequency
- Sweep Speed
- Baseline

2.6.4 Color/Power Doppler

- Color Gain
- Color Persistence
- Color Frequency
- Color Threshold
- Wall Filter
- Steer
- Frame Rate Automatic Optimization

2.7 CLINICAL ANALYSIS

- Measurement Types:
  - Distance
  - Continuous Trace
  - Trace By Points
  - Ellipse Area
  - Doppler Acceleration
  - Doppler Average Velocity
  - Doppler Trace
  - M Mode Distance
  - Time
- OB calculation package
- Vascular calculation package
- Patient reporting
- Custom calculation packages and patient reports

2.8 IMAGE STORAGE

- DICOM level 3
- Still Image Storage (JPEG, DICOM, BMP, TIFF)
- Cine Loop Storage (AVI)
- Patient Management
- CDR-W

2.9 EXTERNAL CONNECTIONS

- Parallel Port
- Serial Port
- USB Port (2 Ports)
- Video IN/OUT
- Audio IN/OUT
- PS/2 (2 Connectors)
- Ethernet
- Modem
- BNC Connector (2 Connectors)
- External AC Receptacle (3 Outlets)
- Main AC Power Connector
- VGA Connector
- LCD Display AC Power Cord

2.10 LANGUAGES

- English
- French
- Mandarin
- Czech

2.11 OTHER FEATURES

- Pictograms
- Preset and free-text annotations
- Selectable language
- Regional font and keyboard layout support (Mandarin, Arabic, etc.)

2.12 ELECTRICAL RATINGS

Input	100V—130V @ 50/60 Hz 200V—250V @ 50/60 Hz
Power Rating	115 VAC @ 4.0A (AC) 240 VAC @ 2.0A (AC)
Fuse Type	7A/250V SLO-BLO
Fuse Size	6.4mm x 31.8mm

2.13 ADJUSTMENTS

2.13.1 Introduction

This section will describe the various options available on the SONIX system in terms of the adjustments of voltage. The system comes equipped with a voltage selector that allows for operations around the world.

2.13.2 Voltage Adjustment

The standard Voltage Rating for North America is 110—125V. The SONIX is equipped to operate at 100—130V and 200—250V, please refer to section **2.12** for more information on power ratings. **Figure 3-1** in section **3.2.9 Voltage Setup** illustrates the two components that control and regulate the voltage input. **Table 2-2** (below) lists the electrical voltage ratings around the world.

Table 2-2: World Electrical Voltage Rating

Afghanistan 220V
Algeria 110/220V
Angola 220V
Antigua 220V
Argentina 220V
Aruba 110V
Australia 240V
Austria 220V
Azores 110/220V
Bahamas 110V
Bahrain 220V
Bangladesh 220V
Barbados 110V
Belgium 110V/220V
Belize 110/220V
Bermuda 110V
Bolivia 110/220V
Bosnia 220V
Botswana 220V
Brazil 110/220V
Bulgaria 220V
Burma 220V
Burundi 220V
C. African Republic 220V
Cameroon 110/220V
Canada 110V
Chad 220V
Chile 220V
China 220V
Columbia 110V
Costa Rica 110V
Cuba 110V
Cyprus 220V
Czech Republic 220V
Denmark 220V
Dominican Rep. 110V

Ecuador	110V
Egypt	220V
El Salvador	110V
Ethiopia	220V
Fiji	220V
Finland	220V
France	220V
French Guiana	220V
Gambia	220V
Germany	220V
Ghana	220V
Gibraltar	220V
Granada	220V
Greece	220V
Greenland	220V
Guatemala	110V
Guinea	220V
Guyana	110V
Haiti	110V
Honduras	110V
Hong Kong	220V
Hungary	220V
Iceland	220V
India	220V
Indonesia	110/220V
Iran	220V
Iraq	220V
Ireland	220V
Israel	220V
Italy	110/220V
Ivory Coast	220V
Jamaica	110V
Japan	110V
Jordan	220V
Kenya	220V
Korea	110/220V
Kuwait	220V
Laos	220V
Lebanon	110/220V
Liberia	110V
Libya	110/220V
Luxembourg	110/220V
Macao	220V
Madeira	220V
Majorca	110/220V
Malawi	220V
Malaysia	220V
Malta	220V
Martinique	220V
Mexico	110V
Nepal	220V
Netherlands	220V
Netherlands Antilles	110/220V
New Caledonia	220V
New Zealand	220V
Nicaragua	110V
Niger	220V
Nigeria	220V
Norway	220V
Okinawa	110V
Oman	220V
Pakistan	220V
Panama	110V
Paraguay	220V
Peru	110/220V
Philippines	110/220V
Poland	220V
Portugal	110/220V
Puerto Rico	110V
Qatar	220V
Romania	220V
Russian Federation	220V
Saudi Arabia	110/220V
Senegal	110V
Seychelles	220V
Singapore	220V
South Africa	220V
Spain	110/220V
Sri Lanka	220V
St. Lucia	220V
St. Marten	110/220V
St. Vincent	220V
Sudan	220V
Surinam	110V
Swaziland	220V
Sweden	220V
Switzerland	220V
Syria	220V

Tahiti	110V	United Kingdom	220V
Taiwan	110V	Upper Volta	220V
Tanzania	220V	Uruguay	220V
Thailand	220V	USA	110V
Trinidad and Tobago	110/220V	Venezuela	110V
Tunisia	110/220V	Vietnam	110/220V
Turkey	110/220V	Yemen	220V
Turks & Caicos Island	110V	Zaire	220V
U.S. Virgin Islands	110V	Zambia	220V
Uganda	220V	Zimbabwe	220V

Caution: *Ensure the correct voltage rating has been selected before turning system ON. Contact an Ultrasonix Technical Support Representative if the appropriate voltage rating is not listed here (***Table 2-2: World Electrical Voltage Rating***, above).*

2.13.3 LCD Display Adjustment

The LCD Display used on the SONIX is a multi-voltage rating ultrasound LCD display. Depending on the voltage set for the system, it will adjust itself with no user intervention. Please refer to section **2.12 Electrical Ratings**.

CHAPTER 3: SYSTEM INSTALLATION

3.1 PRE-INSTALLATION PROCEDURE

3.1.1 Environmental Requirements

Verify the system is to be operated in a room that meets the environmental requirements listed in **Table 3-1** (below).

Table 3-1: System Environment Specifications

Item	Metric Value	US Value
System Size: Width	53.34 cm	21.0 in
System Size: Depth	60.96 cm	24.0 in
System Size: Height	144.78 cm	57.0 in
Ambient Operational Temperature	16 to 35° C	61 to 95° F
Internal Operational Temperature	16 to 55° C	61 to 131° F
Internal Operational Humidity	10% to 80% (non-condensing)	
Storage Conditions	-20 to 60° C	-4 to 140° F
Storage Humidity	10% to 90% (non-condensing)	

Note: *Refer to OEM peripheral manuals for peripheral-specific environment specifications.*

Avoid placing system against walls or structures that may decrease air circulation.

3.1.2 Electrical Requirements

Verify the system is to be operated in a room that meets the electrical requirements listed in **Table 3-2** (below).

Table 3-2: Electrical Specifications

Electrical Rating	Value
Measurement (System Only)	115 Vac @ 47-63Hz
Current Draw (System Only)	4.00A
Power Draw (System Only @ peak)	450 VA
Leakage Current (System Only)	< 100 uA

Note: *Refer to OEM peripheral manuals for peripheral-specific electrical ratings.*

3.1.2.1 Instrument Input Power Rating

An instrument input power rating has been established to clarify the maximum power requirement of the system with all accessories. Depending upon the accessories and options installed, the system may not draw the full amount of power listed below:

Table 3-3: Instrument Input Power Rating

System Voltage, VAC	Nominal System Power Usage, including isolated accessory power	SONIX System Power Usage	Isolated Accessory Power Available
115V	7A Continuous	5.5A Continuous	1.5A Continuous
220V	4A Continuous	3.25A Continuous	0.75A Continuous

For optimal system performance, use a dedicated, interference-free, isolated, grounded wall outlet. To ensure grounding reliability, use a hospital-grade power cord and connect it only to an equivalent hospital-grade socket. The specifications of the hospital-grade power cord as follows:

Table 3-4: Hospital-Grade Power Cord Specifications

Input Voltage	Hospital Grade Power Cord Specifications
100-120V ~, 47-63Hz	125Vac, 15A, 3 wire, 18 AWG, grounding type, 5-15P Hospital Grade plug cap, less than 6 m long, CSA & UL approved
200-240V~, 47-63Hz	250Vac, 15A, 3 wire, 18 AWG, grounding type, 6-15P Hospital Grade plug cap, less than 6 m long, CSA & UL approved

3.1.3 Electrostatic Discharge

During normal operation, the presence of electrostatic discharge (ESD) can cause system reliability issues. The following are the most common causes for ESD:

- Moving people
- Low humidity
- Improper grounding
- Unshielded cable
- Poor connection
- Moving machines

ESD is most likely to occur during periods of low humidity. If the relative humidity is below 50%, static charges can easily accumulate. ESD generally does not occur when the humidity is above 50%. Any time the charge reaches approximately 10,000 volts, it is likely to discharge to grounded metal parts.

Although ESD will not hurt humans, it will destroy certain electronic devices. The high-voltage pulse can burn out the inputs of many integrated circuit (IC) devices. This damage might not appear instantly, but it can build up over time, eventually causing the device to fail.

To avoid damaging the system, use ESD minimizing devices where needed. These ESD minimizing devices include: anti-static mats, humidifiers, and spray. Proper discharge is required before handling any electronic device such as an ESD strap.

3.1.4 Electromagnetic and Radio Frequency Interference

This equipment has been tested and found to comply with the EMC limits for the Medical Device Directive 93/42/EEC (EN 55011 Class 1 and EN 60601-1-2). These limits are designed to provide reasonable protection against harmful interference in a typical medical installation. The equipment generates, uses and can radiate radio frequency (RF) energy and if not installed and used in accordance with these instructions, may cause harmful interference to other devices in the vicinity. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference with other devices, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving device
- Increase separation distance between equipment
- Connect the equipment into an outlet on a circuit different from that to which the other device(s) is connected
- Consult the manufacturer or field service technician for help.

Warning: *The SONIX should not be used adjacent to or stacked with other equipment. If adjacent or stacked use is necessary, the SONIX should be observed in order to verify normal operation in the configuration in which it will be used.*

Table 3-5: EN 60601-1-2:2001 (Table 201)

Guidance and Manufacturer's Declaration—Electromagnetic Immunity		
SONIX Ultrasound Systems are intended for use in the electromagnetic environment specified below. The customer or the user of the SONIX Ultrasound System should ensure that it is used in such an environment.		
Emissions test	**Compliance level**	**Electromagnetic environment-guidance**
RF emissions CISPR 11	Group 1	The SONIX Ultrasound System uses RF energy only for its internal functions. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class A	The SONIX Ultrasound Systems is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Complies	

Table 3-6: EN 60601-1-2:2001 (Table 202)

Guidance and Manufacturer's Declaration—Electromagnetic Immunity			
SONIX Ultrasound Systems are intended for use in the electromagnetic environment specified below. The customer or the user of the SONIX Ultrasound System should ensure that it is used in such an environment.			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment-guidance**
Electrostatic discharge (ESD) IEC 601000-4-2	± 6 kV contact ± 8 kV air	± 6 kV contact ± 8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply lines ±1kV for input/output lines	±2 kV for power supply lines ±1kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1kV differential mode ±2kV common mode	±1kV differential mode ±2kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage DIPS, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5% U_T (>95% dip in U_T) for 0,5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycle <5% U_T (>95% dip in U_T) for 5 sec	<5% U_T (>95% dip in U_T) for 0,5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycle <5% U_T (>95% dip in U_T) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the SONIX Ultrasound Systems requires continued operation during power mains interruptions, it is recommended that SONIX be powered from an uninterruptible power supply (UPS) or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3A/m	3A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial environment.
Note: U_T is the AC mains voltage prior to application of the test level.			

Table 3-7: EN 60601-1-2:2001 (Table 204)

Guidance and Manufacturer's Declaration—Electromagnetic Immunity			
The SONIX is intended for use in the electromagnetic environment specified below. The customer or the user of the SONIX should ensure that it is used in such an environment.			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment-guidance**
Conducted RF IEC 61000-4-6 Conducted RF IEC 61000-4-3	3 Vrms 150 kHz to 80 MHz 3 V/m 80 MHz to 2,5 GHz	3 Vrms 3 V/m	Portable and mobile RF communications equipment should be used no closer to any part of the SONIX, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distances: $d = 1{,}2\sqrt{P}$ 150 kHz to 80 MHz $d = 1{,}2\sqrt{P}$ 80 MHz to 800 MHz $d = 2{,}3\sqrt{P}$ 800 MHz to 2,5 GHz where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and *d* is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey[a] should be less than the compliance level in each frequency range[b]. Interference may occur in the vicinity of equipment marked with the following symbol:
Note 1: At 80 MHz and 800 MHz, the higher frequency applies. **Note 2:** These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			
[a] Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the SONIX is used exceeds the applicable RF compliance level above, the SONIX should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the SONIX. [b] Over the frequency range 150 KHz to 80 MHz, field strengths should be less than 3 V/m.			

Table 3-8: EN 60601-1-2:2001 (Table 206)

Recommended Separation Distances Between Portable and Mobile RF Communications Equipment and the SONIX			
The SONIX is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the SONIX can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the SONIX, as recommended below, according to the maximum output power of the communications equipment.			
Rated maximum output power of transmitter W	**Separation distance according to frequency of transmitter m**		
	150 kHz to 80 MHz $d = 1{,}2\sqrt{P}$	**80 MHz to 800 MHz** $d = 1{,}2\sqrt{P}$	**800 MHz to 2.5 GHz** $d = 2{,}3\sqrt{P}$
0,01	0,12	0,12	0,23
0,1	0,38	0,38	0,73
1	1,2	1,2	2,3
10	3,8	3,8	7,3
100	12	12	23
For transmitters rated at a maximum output power not listed above, the recommended separation distance (*d)* in meters (*m*) can be estimated using the equation applicable to the frequency of the transmitter, where *P* is the maximum output power rating in watts (W) according to the transmitter manufacturer. **Note 1:** At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies. **Note 2:** These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			

3.1.5 Wiring Requirements

3.1.5.1 Main AC Connection

The electrical feed to the system should be a dedicated/isolated line (no other equipment on the same line) with a third-wire ground. Ensure a low impedance path for current to return to the source.

3.1.5.2 Network Connection

It is the user's responsibility to provide an Ethernet connection to the system and to install the correct type of cable in accordance with the building's applicable standards. The commonly used cable is CAT5 (Category 5, 10 Base-T, unshielded twisted pair).

3.1.5.3 Image Management Network

Obtain the following information from the system administrator:

- list of all equipment that is part of the Image Management network
- logical diagram of the network showing topology, subnets, etc.
- locations of all equipment
- location of all LAN attachment points
- locations of all power outlets and connector types
- location of any dedicated analog phone line
- All necessary Internet Protocol (IP) addresses and subnet information

3.2 SYSTEM INSTALLATION

3.2.1 Pre-Requisite

Tools Required: Box cutter or scissors

Number of People Required: Preferably two (2).

3.2.2 Preliminary Inspection

1. Examine the shipping crate and box for any damage that may have occurred during transport.
2. Look for evidence to ensure that the crate has not been opened.
3. Report any damage to both the carrier and Ultrasonix.

3.2.3 Uncrating Instructions

Note: *Before uncrating the system, ensure there is adequate room for removing it from its packaging. The space should be at least equivalent to the crate's overall dimensions.*

1. Cut and remove the ¼" nylon strap around the box.
2. Remove top and side covers.
3. Remove ¼" nylon strap holding the accessory box.
4. Remove the User Manual and necessary documents.
5. Remove plastic wrapping from around the system.

6. Remove the tension from the straps holding the underside of the Sonix.
7. Remove the straps from the mounting holes.
8. Unlock the wheels, so the system is free to move.

9. Cut one side of the cardboard attached to the wooden crate so the system can be rolled down.

Note: *It is best to cut the cardboard on the side facing the wheels.*

If there are at ***least two (2) people*** *unpacking the system, it is possible to lift the SONIX out of the crate.*

3.2.4 Mounting the SX1.1 Arm for the LCD Display

Note: *Refer to the System Label on the lower left side of the back of the SONIX. The instructions for mounting the SX1.1 Arm will apply only to systems with Serial Numbers beginning with* **SX1.1***.*

Tools required: 4mm Allen key (provided).

Note: *Be sure to uncrate the system first (see* **3.2.3 Uncrating Instructions** *for details).*

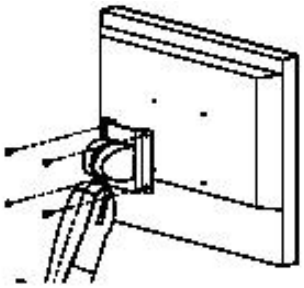
1. Remove the bubble wrap from around the system's monitor tower and arm.

2. Install the monitor’s arm onto the monitor’s tower.

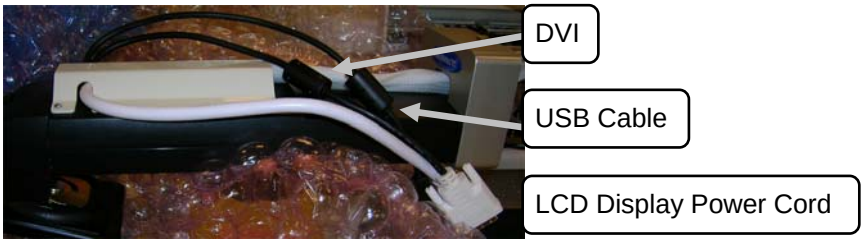
3. Tighten the monitor arm's screw using the 4mm Allen Key provided with the system.

3.2.5 Mounting the LCD Display

Figure 3-1: LCD Display Assembly



1. Adjust the monitor base, rotating the support to face the back of LCD display.
2. Rest the LCD display on its support.
3. Fasten the base of the LCD display to the support arm with four (4) thumb screws (provided).
4. Plug the three external cables extending from the support into the back of the LCD display: LCD display power, DVI and USB cable.



3.2.6 Connectivity Panel Check

The system case connectivity panel is accessible from the top of the system case. Check all cables are securely plugged into their respective slots. In addition, remove the rear cover as per section **12.2** and ensure the additional power cables are connected securely.

Figure 3-2: Connectivity Panel (SX1.0)

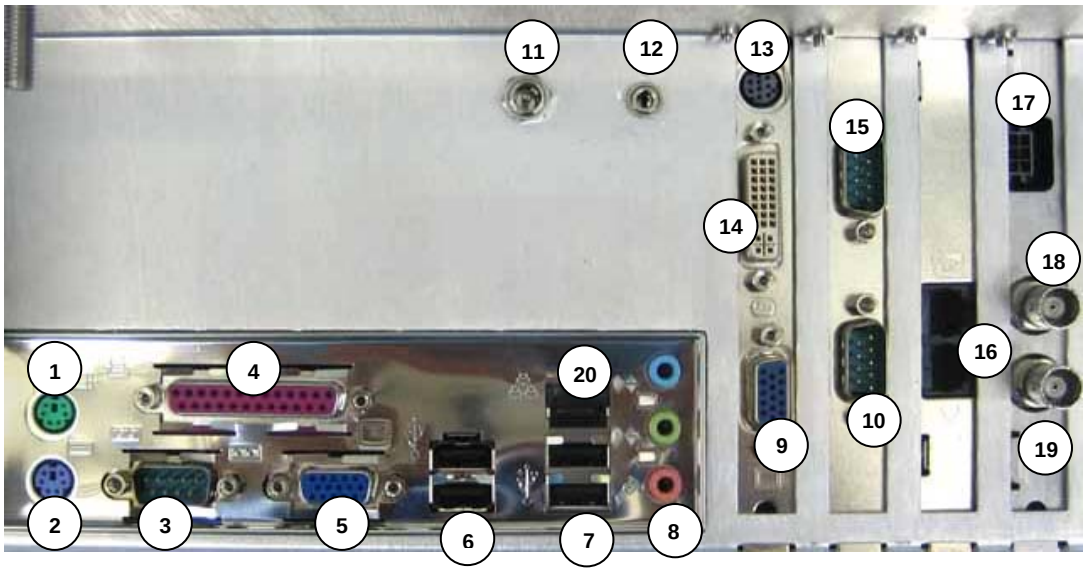


Figure 3-3: Connectivity Panel (SX1.1)

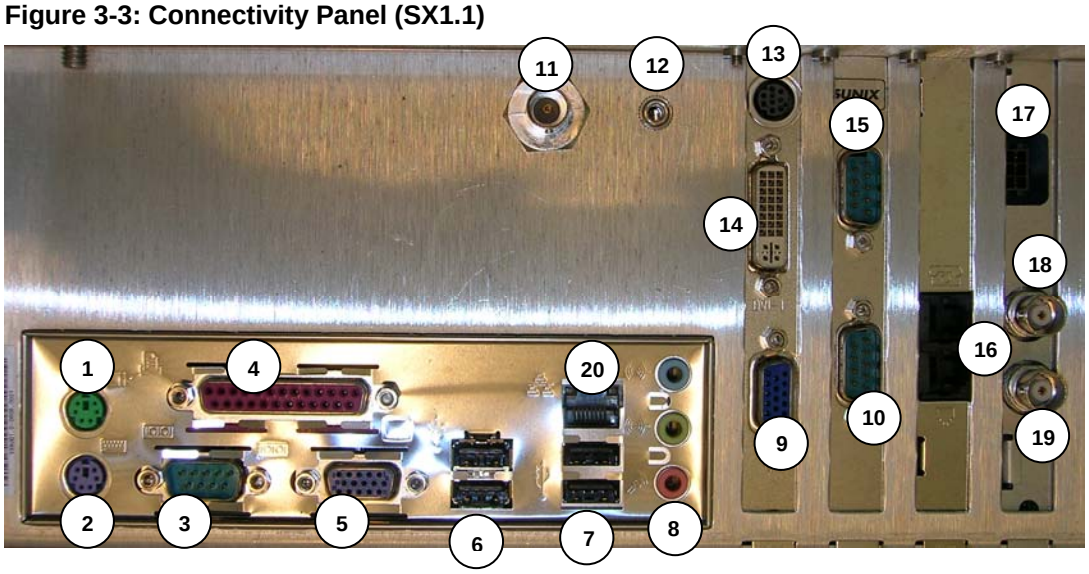


Table 3-9: Connectivity Panel Connections

1	PS2 Mouse port	PS2 mouse port—used by the operator console trackball
2	PS2 Keyboard port	PS2 keyboard port—used by the operator console keyboard
3	RS232 Serial port	Used by the operator console. Plug either one of the RS232 ports here.
4	Parallel port	A factory installed dongle is connected to this port which is required to activate some of the system features. This port can be used to connect an Ultrasonix-approved parallel-port printer.
5	Video output port (disabled)	This port is disabled.
6	USB ports	USB ports—used by the front of operator console
7	Additional USB ports	2 additional USB ports. These ports can be used to connect printers and other Ultrasonix-approved USB peripherals
8	Sound connections	Line-in—can be used to connect an Ultrasonix-approved audio input device. Speaker—used by the system speakers Microphone—used by the console's microphone –disabled.
9	Video VGA output	This port is available for connecting either: An Ultrasonix-approved RGB-Sync output video device such as a VCR or DVD recorder. For this, a custom cable will be provided as follows: An Ultrasonix-approved computer video output device such as a LCD projector or a VGA monitor.
10	RS232 Serial Port	This port is used by the console. Plug either one of the RS232 ports here.
11	Speaker power connector	This port is used by the system's speakers
12	System Power Switch	This port is connected to the console's ON/OFF switch

13	Video outputs	This port is connected to a video splitter module that outputs B&W and Color video. It will look like one of the two (2) photos, below. ***Note:*** *The module B&W and Color video outputs are typically routed to the back connectivity panel. However, these can also be connected directly to a video output device. See the "Back connectivity panel" section for details.*
14	Digital Video DVI video output	This port is used by the system LCD display. A DVI splitter can be used to connect additional Ultrasonix-approved DVI Video output devices.
15	RS232 Serial port	This port is available for connecting an Ultrasonix-approved RS232 Serial device.
16	Modem connections	Typically the modem line is routed directly to the back connectivity panel. However, it can be connected directly to a phone line from inside the system.
17	Console power connector	This port is used by the console.
18	Freeze BNC	This port can be connected directly to an Ultrasonix approved switching device such as a foot pedal. The Foot Pedal action can be configured as explained in the Peripherals section.
19	Print BNC	This port can be connected directly to an Ultrasonix approved triggered device, such as a video printer. The trigger operation can be configured as explained in the Print Keys configuration section.
20	Ethernet	This port is usually routed to the back connectivity panel, however the network connection can be connected directly to this port. This port supports 10/100Mb as well as 1Gb Ethernet connections.

3.2.7 Back Connectivity Panel

The Back Connectivity Panel can be accessed from the back of the system. The connectors are routed internally to the system case connectivity panel which enables easy configuration. In its standard configuration, the panel provides:

B&W Video (B&W video output): This port can be used to connect an Ultrasonix-approved video output device such as a B&W video printer or a frame grabber.

Col Video (Color video output): This port can be used to connect an Ultrasonix-approved video output device such as a Color video printer, VCR or a frame grabber.

Net (Network) or **LAN**: This port can be used to connect the system to a network. This port supports 10Mb/100Mb and 1Gb Ethernet networks.

Phone: This port can be used to connect the system to a phone line for online chat support.

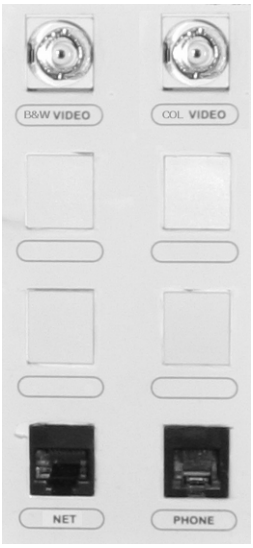


Figure 3-4: Back Connectivity Panel

3.2.8 Front Console Connectivity

Figure 3-5: Back Connectivity Panel

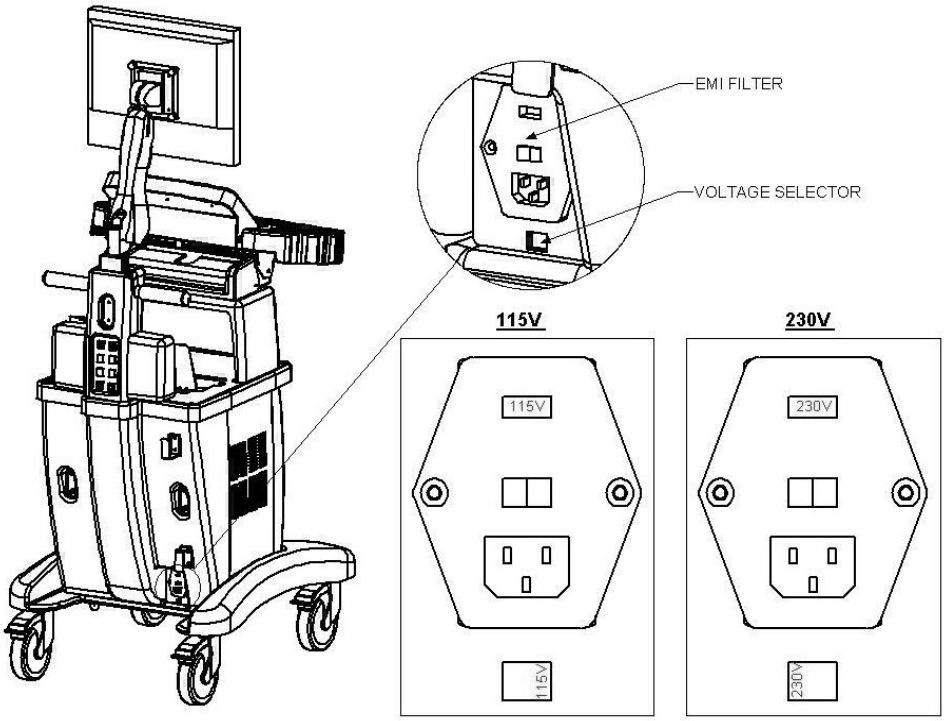
The SONIX system provides two (2) USB ports and a DVD/CD writer at the front of the operator console.

The two (2) USB Ports can be used to connect Ultrasonix-approved USB devices - such as a USB thumb drive - to the system for image file transfer.

3.2.9 Voltage Setup

Before powering up the system, ensure that the voltage on the back of the machine corresponds with the voltage rating in your area as listed in section **2.13.2 Voltage Adjustment**. If it is not, switch the voltage selector and the fuse box in the EMI Filter to the correct voltage rating. Please refer to section **3.2.10 Changing Fuses** for details on how to remove the fuse box and flip the voltage. The illustration below identifies the two parts.

Figure 3-6: Voltage Adjustment Devices



3.2.10 Changing Fuses

It is easier to change fuses if the rear cover is removed first.

Tools required: #1 flat head screwdriver.

Table 3-10: Changing a Fuse

	Step 1: Make sure the system is completely turned off. Unplug the SONIX from the wall socket and remove the rear cover.
	Step 2: Use the screw driver to open the fuse box lid.
	Step 3: Use the screw driver to take out the fuse box. Position the screw driver at the top, just like in step 2.
	Step 4: Replace the 2 fuses on both sides of the fuse box. It should not be necessary to use a screwdriver to remove the fuses. ***Note:*** *Make sure the fuse type is: 3AG Slo-Blo, 7A/250V*

3.2.11 Final Inspection

1. Inspect the system for scratches or damage. Note any damage to the system and report it to Ultrasonix.
2. Plug main AC to primary power connector.
3. Turn on the LCD display.
4. Turn on the system.

   Note: *The console* **POWER** *button is located to the left of the touch screen.*

5. Inform the facilities representative when the system is installed and ready for any safety testing they would normally conduct.
6. Once it is running, the LCD display will show a black background image field with settings information or the patient ID menu.

CHAPTER 4: PERFORMANCE TEST

4.1 INTRODUCTION

This section describes the various tests performed on the system immediately following installation, upgrade and repair. The purpose of the performance testing is to verify correct operation of system (hardware, software and mechanical). During these tests, the system should be running in normal operation mode.

4.2 CONSOLE TEST

Table 4.1 describes the applicable commands for each imaging mode operation.

Table 4-1: Mode Command Table

Mode	Default Applicable Command	Default Programmables
B Mode Dual B Mode Quad B Mode Compound B Mode	• Gain • Depth • Focus • Angle • Color Map • Power • Persistence	1. Optimization Mode 2. Sector Size/Zoom 3. Optimization Mode DR 4. Wide Mode
Color Mode	• Depth • Focus • Angle • Baseline • Invert • PRF • Color Map • Color Gain • Power • Frequency • Acoustic Display • Color Frequency	1. Optimization Mode 2. Sector Size/Zoom 3. Optimization Mode DR 4. Wide Mode
Doppler Modes	• Doppler Gain • PRF • Doppler Frequency • WF • Sweep Angle • Sweep • Gate • Live Mode	1. Optimization Mode 2. Sector Size/Zoom 3. Optimization Mode DR 4. Wide Mode

Mode	Default Applicable Command	Default Programmables
All Modes	• TGC • Annotation • Transducer Selection • Patient Management • Cine Loop • Freeze • Cine Loop Record • Measurement • Mouse Wheel • Print • Optimization Mode DR • Optimization Mode • LD • Persistence • Gain	1. Optimization Mode 2. Sector Size/Zoom 3. Optimization Mode DR 4. Wide Mode

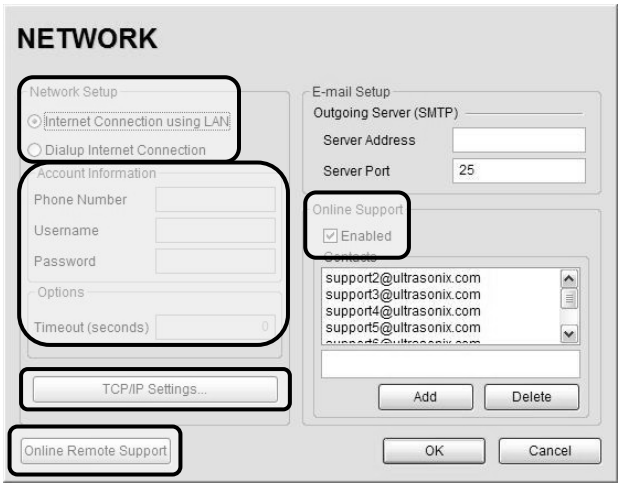
The current mode is identified with an ORANGE LED. Applicable console operations are identified with a BLUE LED or a PURPLE LED for QUAD. Adjust the image with the console controls and verify the operation corresponds with the controls. Note any operations that do not function properly.

4.3 IMAGE TEST

1. Connect each of the different transducers available and run B mode.
2. Verify that the image scanned has all elements present. Note any black static line(s) that are visible on the image.
3. If found, test with the other transducers to verify the non-visible element(s) is in the same location.
4. Try different transducer connectors to eliminate the possibility of a malfunctioning transducer.

4.4 COMMUNICATION TEST

Figure 4-1: Network Configuration Page



LAN connection (if available)

1. Connect an RJ45 cable to the "**LAN**" port located on the Back Panel.
2. Press the console **MENU** button.
3. Select ***Admin…*** > ***Network***.
4. On the ***Network*** setup page, select ***Internet Connection using LAN*** and then ***TCP/IP Settings*** to configure the required settings.
5. Under ***Online Support***, ensure the ***Enabled*** check box has been selected.
6. Select ***OK*** and exit the menu system.
7. To test, press the console **QSONIX** button and select ***Online Support***. This should connect you to an Ultrasonix Technical Support Representative.

Note: *It may be necessary to restart in order for the changes to take affect.*

Dial-up connection (if available)

1. Connect an RJ11 cable to the "**Phone**" port located on the Back Panel.
2. Press the console **MENU** button.
3. Select ***Admin…*** > ***Network***.
4. On the ***Network*** setup page, select ***Dial-up Internet Connection***, then complete the ***Account information*** (***Phone Number***, ***Username***, ***Password*** and ***Timeout***).
5. Under ***Online Support***, ensure the ***Enabled*** check box has been selected.
6. Select ***OK*** and exit the menu system.
7. To test, press the console **QSONIX** button and select ***Online Support***.. This should connect you to an Ultrasonix Technical Support Representative.

Note: *While the system is dialing out, the current dialing status to your ISP will be displayed.*

4.5 REMOVABLE HARDWARE TEST

The SONIX supports many different types of removable hardware other than what comes with the system as a default package. The following comprises a list of the supported removable hardware.

- Medical Grade VCR
- Medical Grade B/W Printer
- Medical Grade Color Printer
- PTR Port Printer (Regular Printer)
- DVDRW
- USB Media – Memory Stick, USB HD

The hardware test is for the media/hardware that comes standard on the SONIX.

The system comes equipped with a DVD drive that allows the user to archive images/movies. Place a blank DVD or DVDRW into this drive. From the ***Patient Management*** page, select a patient to archive. Verify that the data is transferred onto the removable media.

4.6 HARDWARE TEST

When the software is started, a check for all hardware is performed.

The areas tested are extremely crucial and if at any stage there is a failure, the system will not function properly. Please note the fault(s) when it occurs and report it to an Ultrasonix Technical Support Representative.

4.7 MECHANICAL TEST

Note: *Ensure that the caster brakes are in the OFF position before doing this test.*

Move the system around to check that the casters rotate properly.

Note: *The SONIX will be more difficult to move around on carpeting due to increased friction on the casters.*

Finally, rotate and adjust the operator console. Press all buttons and toggles to ensure that none are in a locked position.

CHAPTER 5: SOFTWARE FEATURES

5.1 INTRODUCTION

This section encapsulates some of the details in **CHAPTER 2: System Specifications**. The main objective of this section is to provide in depth knowledge of the advance features of the SONIX ultrasound system.

5.2 SOFTWARE MODES

The system comes equipped with many modes of operations. Please refer to the SONIX User Manual for complete details.

5.3 SOFTWARE UPDATES

Internet Update

1. Press the console **MENU** button.
2. Click on ***Admin... > Software Updates***.
3. From the ***Available Updates*** drop-down menu, select the appropriate software version.

   Note: *Please consult with an Ultrasonix Technical Representative in order to determine which version to install.*

4. Click on ***Update***.
5. The system will automatically download the version specified and auto install it.
6. When the installation is complete, the software will reboot itself to apply the changes.

CD Update

1. When an Internet connection is not available for any reason, contact an Ultrasonix Technical Support Representative and a CD version can be shipped.
2. An update can also be downloaded from our website (*updateXXX.zip*) and burned onto a CD.

   Note: *Please check with an Ultrasonix Technical Support Representative for the web address to download the update.*

3. Upon receiving the update CD, double-check the version number to ensure that it is the correct one.
4. Place the CD into CD-Rom drive at the front of the operator console.
5. Press the console **MENU** button.
6. Click on ***Admin... > Software Updates***.
7. From the ***Update Location*** drop-down menu, select ***DVD/RAM*** drive.

8. From the ***Available Updates*** drop-down menu, select the appropriate file (e.g., *update241.zip*).
9. Click on ***Update***.
10. Certain version numbers will cause a pop-up window to appear automatically with instructions on calibrating the touch screen.

Note: *If the pop-up window does not appear, skip to Step 13.*

11. On the touch screen, place the tip of your finger where the bullseye is currently located. You will need to perform this step three (3) times.
12. Wait a few moments until the ***OK*** button can be accessed then use the trackball and **SELECT** button to click on it.
13. Wait for the Update to finish, at which point the system now be updated.
14. Press the console **MENU** button to check the software version.
15. Perform a scan and check the scanning modes to make sure the SONIX is working properly.

Note: *If an error occurs during installation, please contact an Ultrasonix Technical Support Representative for further instructions.*

5.4 SYSTEM RECOVERY

Before performing a system recovery on the system, please consult an Ultrasonix Technical Support Representative as this ***should only be done as a last resort***.

Caution: *System Recovery will erase all Patient Data on the hard drive!*

Before attempting system recovery, ensure the following items are readily available:

- USB windows keyboard
- USB memory stick
- SONIX Recovery CD (originally delivered in the binder that came with the system)
- System Configuration Document
- Serial Number (for example: SX1.0-0505.0080)
- System ID Number (can be retrieved via **MENU > *Admin* > *Licensing***
- Windows Key (SONIX Recovery CD or SONIX Modulo or e-mail Ultrasonix for this license)
- copy *License.key* from D:\ directory on to a USB memory stick
- MRU # 123 – MRU key – from *dongle.txt* (e-mail Ultrasonix for this license)
- Download Video card driver (for versions 2.3.5 and higher, this should be available on the Recovery CD, or a copy can be obtained at: http://www.nvidia.com/object/winxp_2k_77.77.html.

To perform a System Recovery:

1. Connect the SONIX to the Internet.
2. Delete the C partition then create it again and set it to 20003 MB.

   Note: *If possible, do **not** delete the D partition as this is where your patient data is stored.*

3. Enter **your** serial number as an MSN user id: (e.g., sx1005100080@hotmail.com). The MSN password is **ultrasonix**.
4. Enable "***Sign in automatically***".
5. After system recovery, activate Windows via the Internet and select "***No***" to register with Microsoft.
6. Update Windows from ***Start Menu > Windows Update***, ensuring that all critical patches are installed.
7. Turn off "***Automatic Update***".
8. If you downloaded the video card driver, install it.
9. Follow the procedure in the System Configuration document.
10. Copy *License.key* and *dongle.txt* into D:\ then re-import them via **MENU > *Admin* > *Licensing***.
11. Click on ***Local Drive…*** (ensure ***File Type*** is "***All files***").
12. Update the SONIX to the latest software release (refer to section **5.3 Software Updates** for details).

CHAPTER 6: CONNECT PERIPHERALS

6.1 B&W OR COLOR THERMAL PHOTO PRINTER

Connect the BNC connector from "B&W (Video) Out" or "Col (Video) Out" (on the Back Connectivity Panel) to the "Video In" connection on the printer.

Note: *In the top panel, the video splitter's green plug is for B&W and the blue plug is for Color.*

The system may have a T-connector attached to the green plug and blue plug allowing for a direct connection and a cleaner look.

1. Press the console **MENU** button.
2. Click on ***Admin... > Peripherals > VCR/Photo***.
3. Ensure ***Enable Video Out*** has been selected.

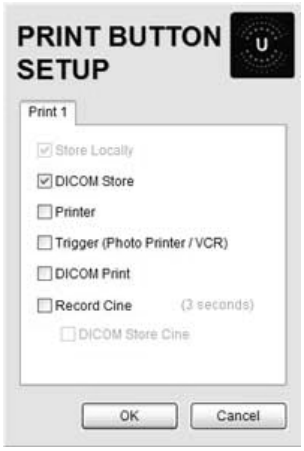
Note: *Without a remote trigger, press the Print button on the Video Printer (i.e. Thermal Printer).*

6.2 REMOTE TRIGGER

Open the Top Panel. You should see there are two BNC plugs, please connect one end of the Remote Trigger cable here. If you are standing facing the back of the machine, the closer one, is the Print BNC (Trigger - Connection 19 in section **3.2.6 Connectivity Panel Check**).

The other end of the Remote Trigger cable is a stereo mini plug. It goes to the back of the printer

1. Press the console **MENU** button.
2. Click on ***Admin... > Print Keys***.
3. From the ***Print*** tab, select the desired print key (***Print 1, 2 or 3***), check ***Trigger*** and press ***OK***.
4. When the corresponding console **PRINT** button is pressed, the Thermal Printer should print.



6.3 INKJET OR LASER PRINTER

1. Open the Top Panel and plug the Inkjet or Laser printer USB cable into one of the USB ports.
2. To add a printer, press the console **MENU** button.
3. Click on ***Admin... > Peripherals***.
4. Under the ***Paper Printer*** tab, double click ***Add Printer***.
5. Follow the instructions on the screen and select the USB port from the drop down and use the Driver CD that came with the printer to install the drivers via the Have Disk button.

6.4 IMAGE SHEET PRINTING

1. Once the SONIX has been switched on and loaded, press the console **MENU** button.
2. Click on ***Admin... > Peripherals***.
3. Under ***Image Sheet Printing***, the default is set to print in 2 columns and 3 rows which means 6 images per sheet. Therefore, before the printer will print, it will wait for 6 images. Pressing the Print button six (6) times will force it to begin printing. To print one image per sheet, set columns to 1 and rows to 1. This will result in a single, large image.
4. Make certain the ***Enable*** box is checked.
5. Click ***OK***.

6.5 PAPER PRINT KEY SETUP

1. Press the console **MENU** button.
2. Click on ***Admin... > Print Key***.
3. There are three tabs: ***Print 1***, ***Print 2***, and ***Print 3***.
4. To set up printing to paper, select one of the three (3) tabs and check the ***Printer*** box.

   Note: *Each tab corresponds to the console print button with the same name:* **PRINT 1***,* **PRINT 2** *or* **PRINT 3/ARCHIVE***.*

5. Click ***OK***.

CHAPTER 7: COMPONENTS AND ASSEMBLY

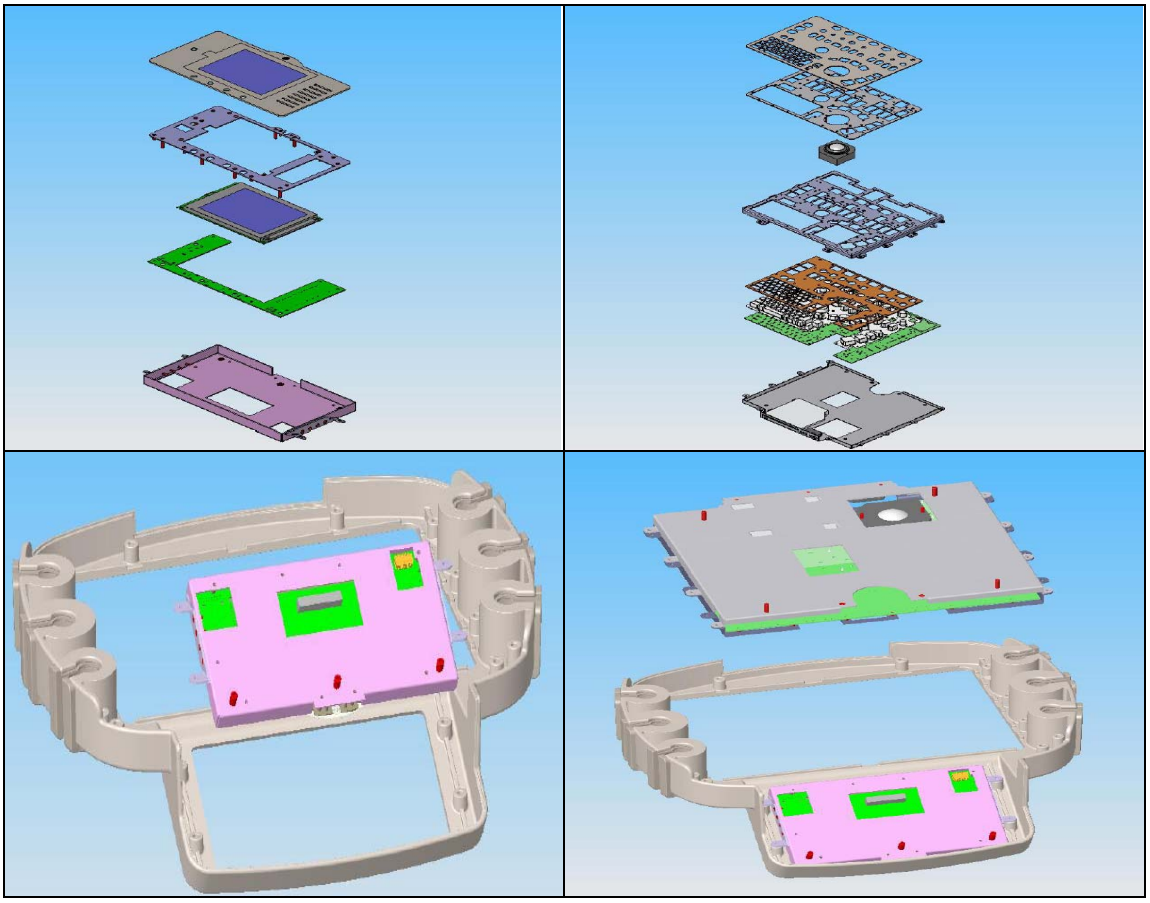
7.1 INTRODUCTION

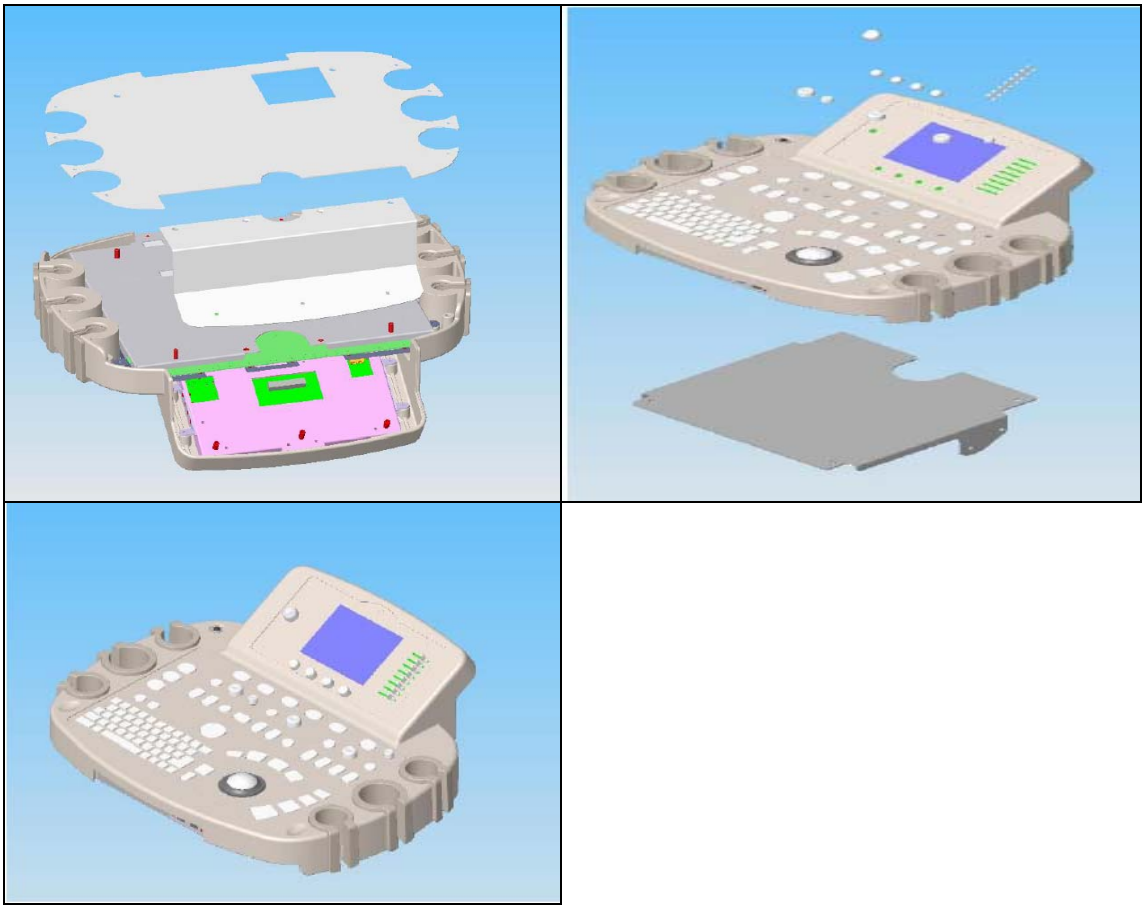
This section illustrates all the various components needed to completely assemble the SONIX ultrasound system. The component drawings are divided into categories for easier access. Each component has a brief explanation of what it is and where such part could be found within the system. When service is preformed by Ultrasonix Technical Support, the label names on the components will be used to avoid any discrepancies.

7.2 ASSEMBLY DRAWINGS

7.2.1 Console Assembly

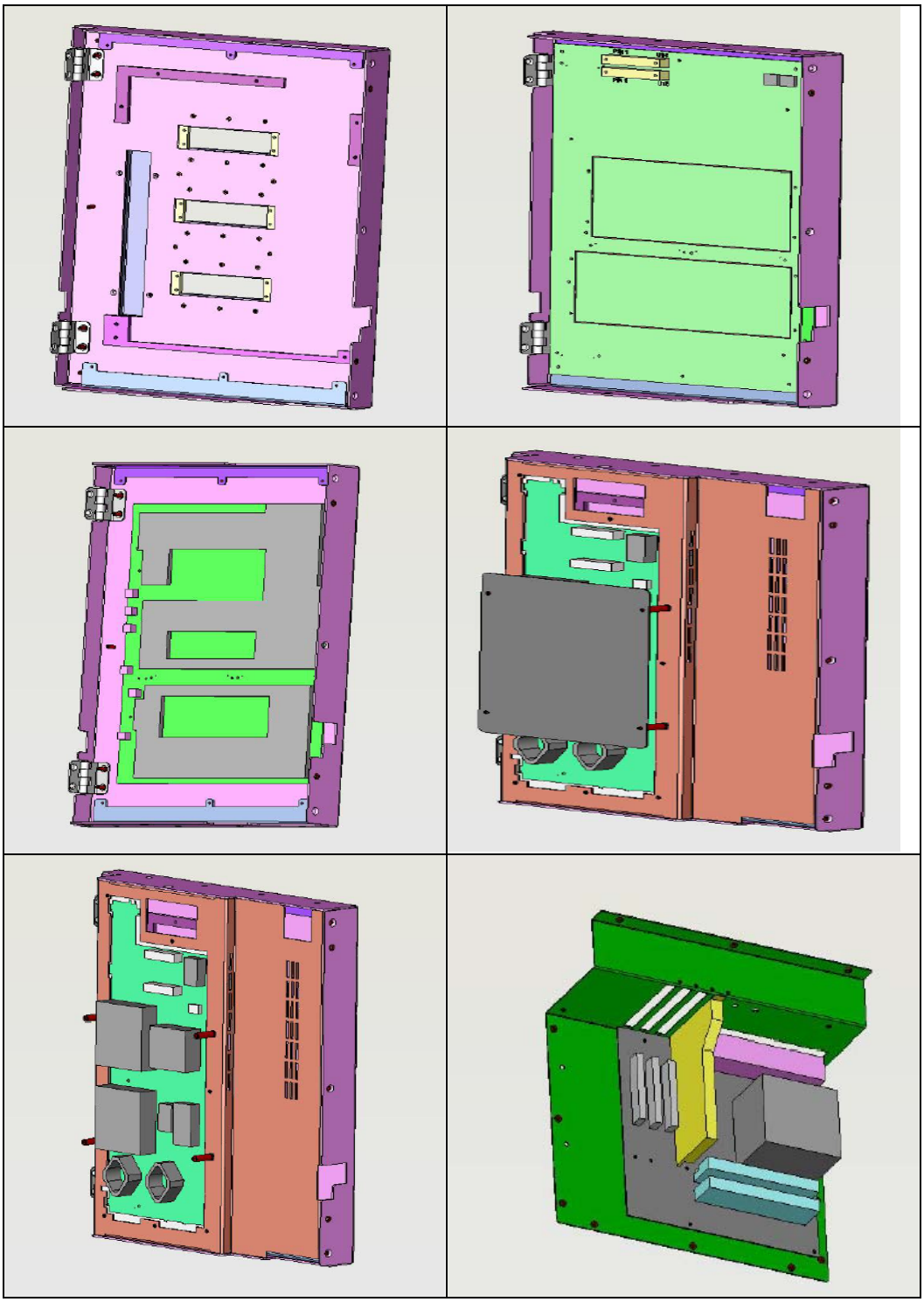
Figure 7-1: Console Assembly Drawings

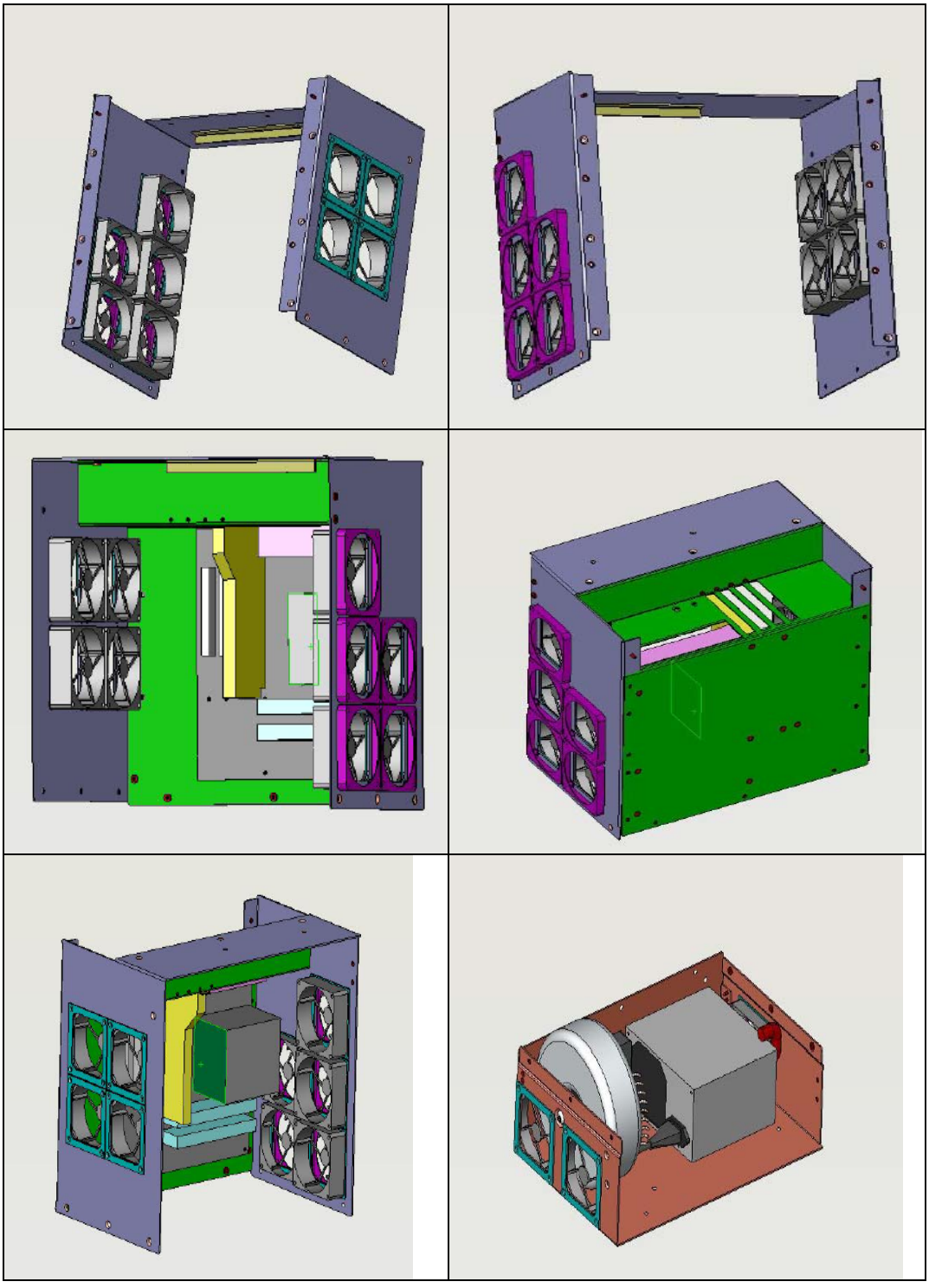


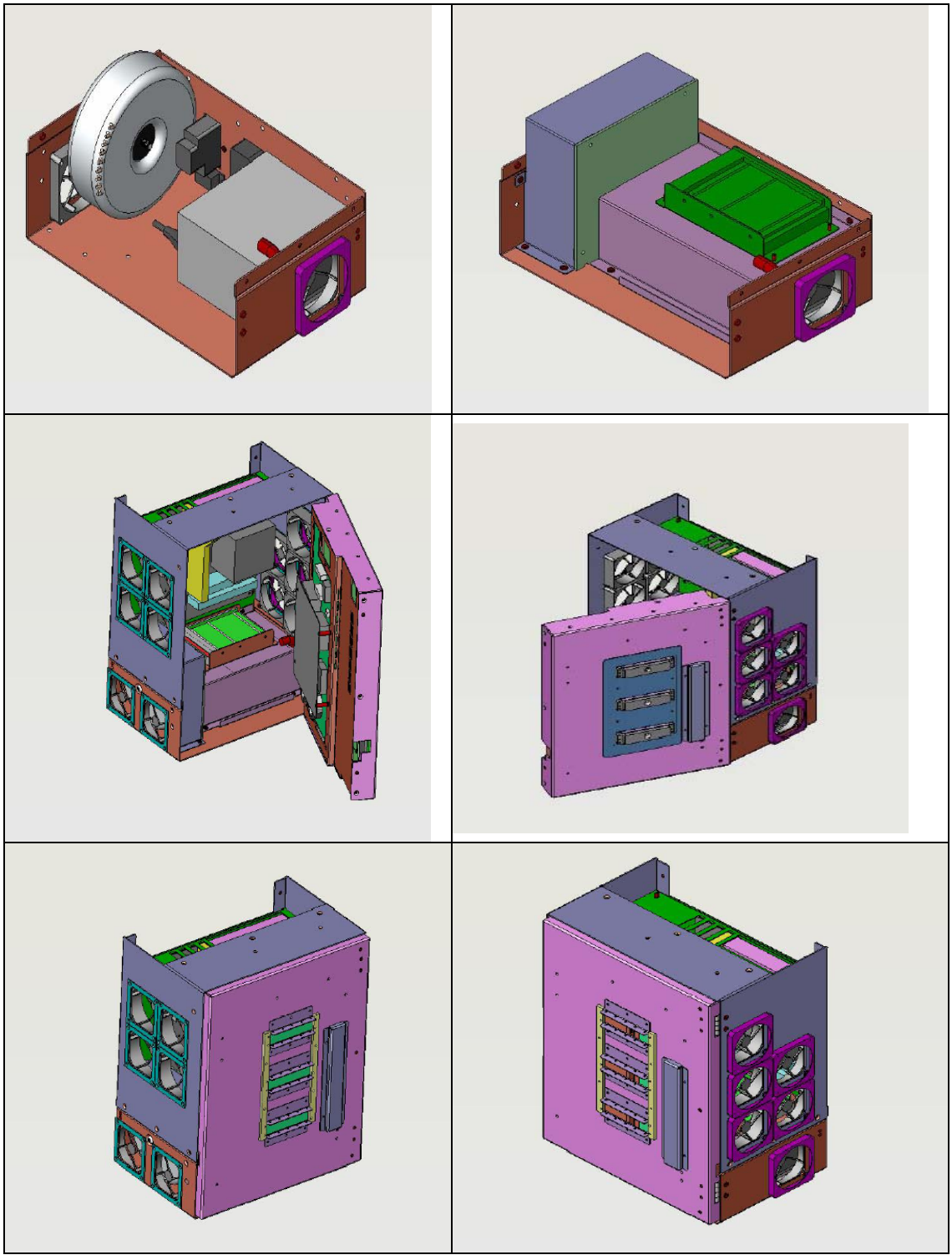


7.2.2 Modulo Assembly

Figure 7-2: Modulo Assembly Drawings

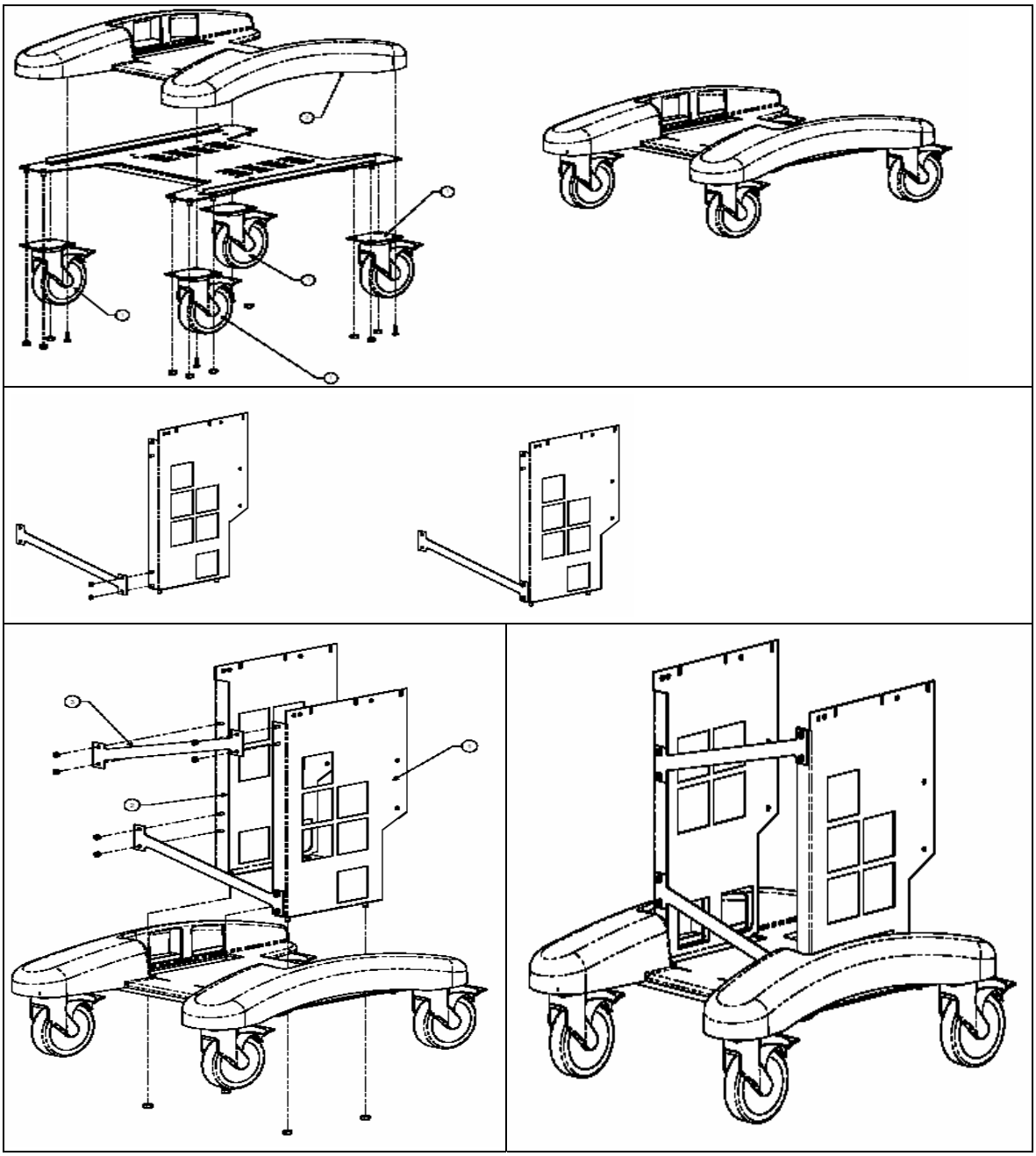


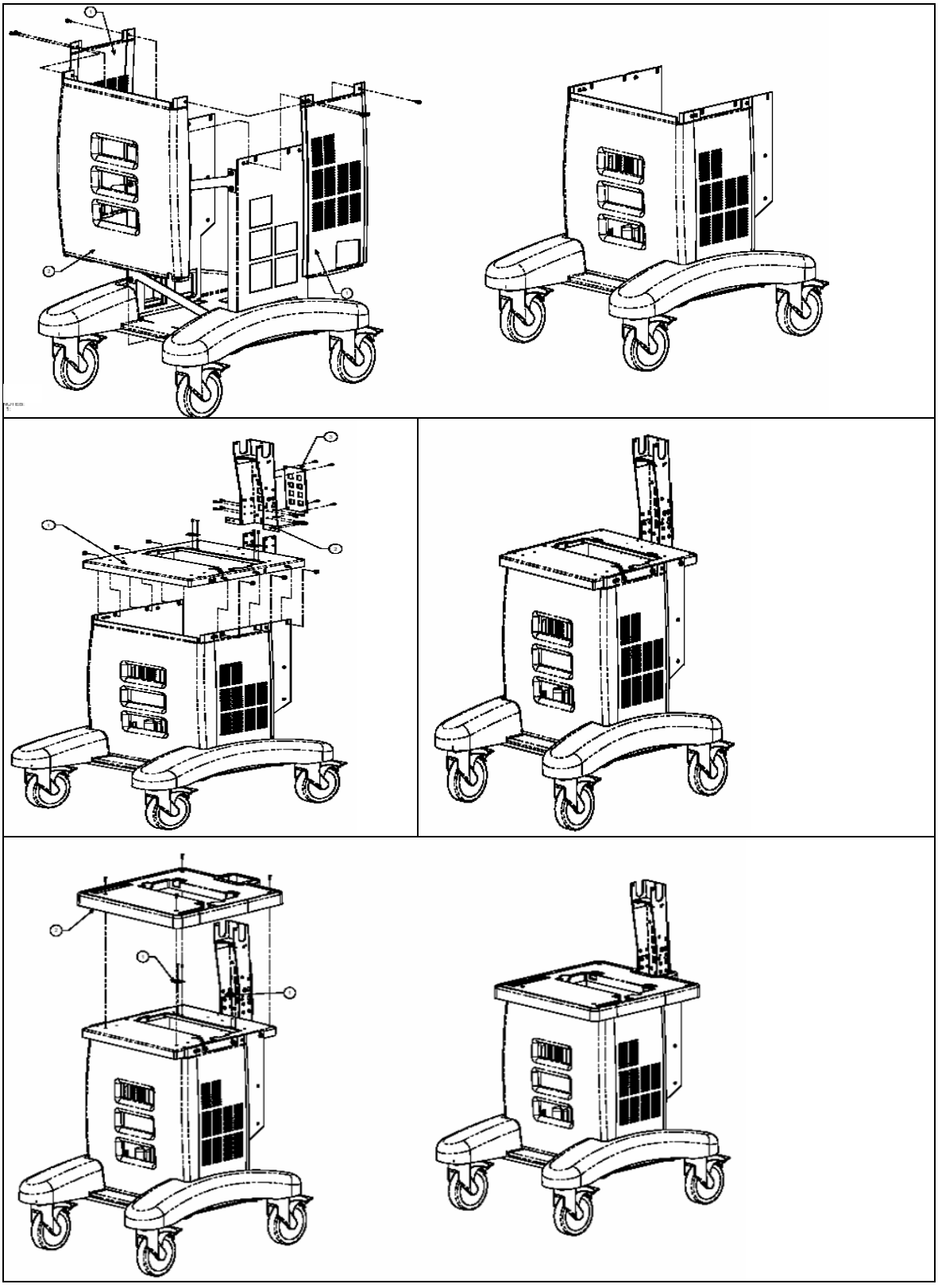


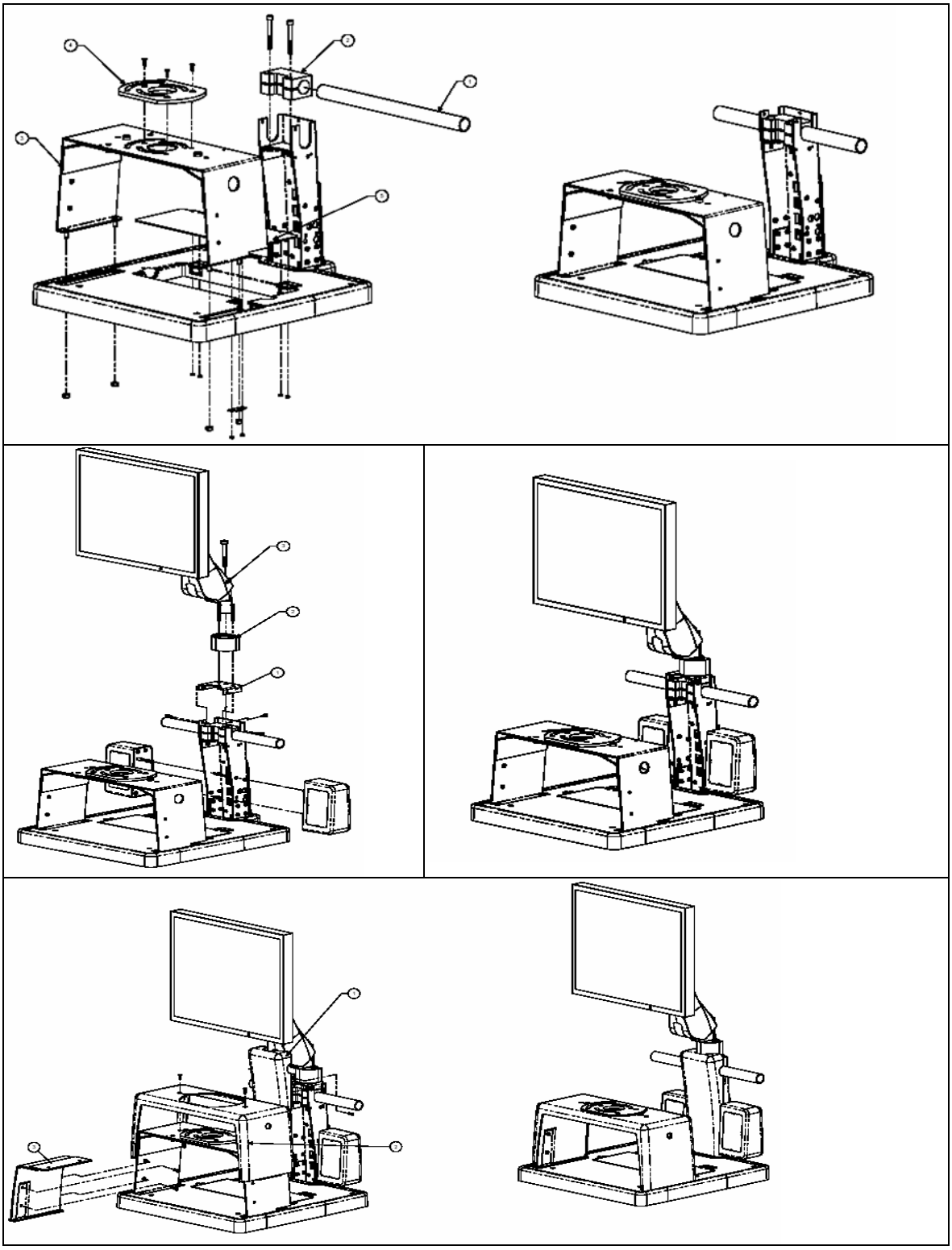


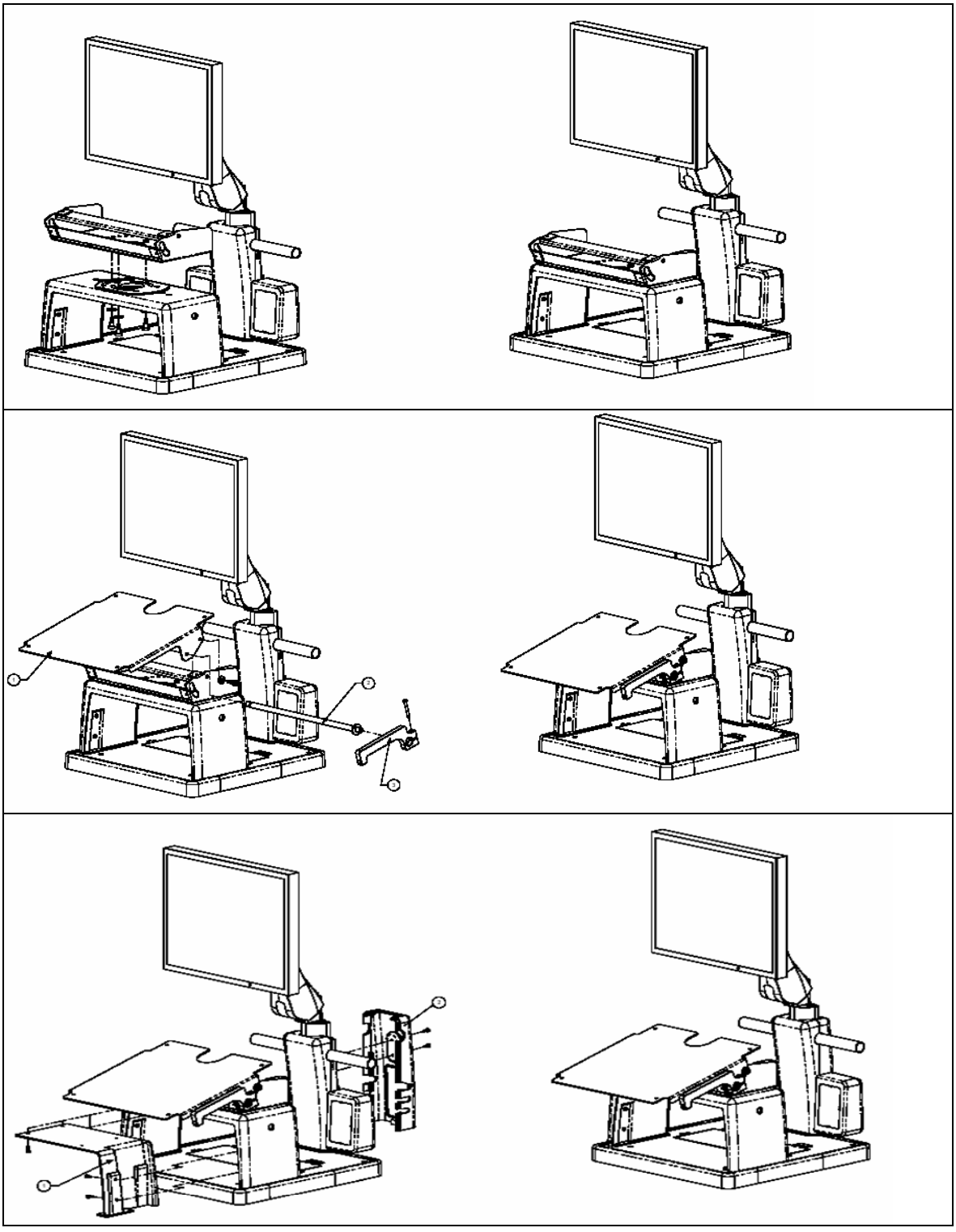
7.2.3 Cart Assembly

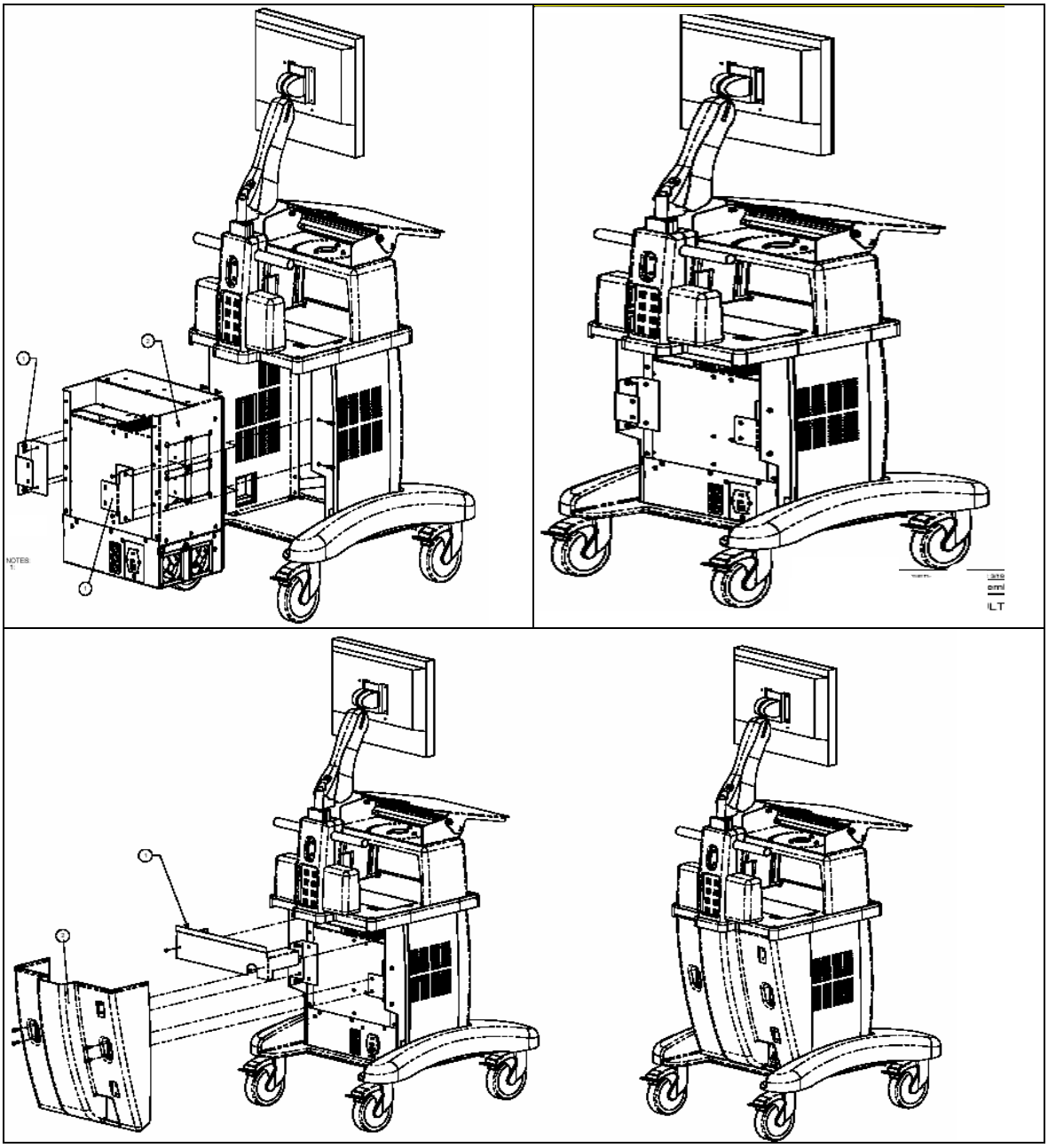
Figure 7-3: Cart Assembly Drawings









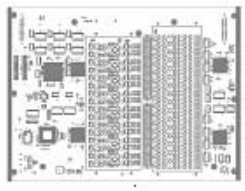
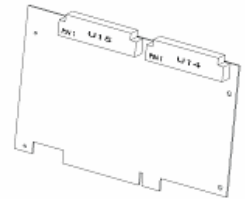
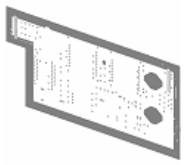
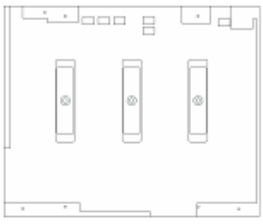


7.3 ELECTRICAL COMPONENTS

This section illustrates the various custom PCBs and main power components that are used.

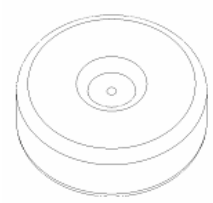
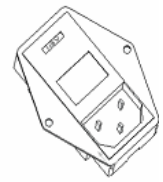
7.3.1 Ultrasonix Custom PCBs

Table 7-1: Ultrasonix Custom PCBs

	Component Name: ECHO US Module Board` Description: 12 Layers PCB. This board uses state of the art technology. Image modes are downloaded in a fraction of a second due to the advanced FPGAs and DSPs. The primary function of this board is to compute data received and sends to the PC to translate. Dimension: 12” X 16” Color: Green Mask
	Component Name: ECHO PCI Card Description: 8 Layers PCB. The PCI Card is the bridge between the US Module and the PC Motherboard. Dimension: 7” X 4” Color: Blue Mask
	Component Name: ECHO Power Board Description: 8 Layers PCB. This board supplies the US Module with the +48V and –48V. This board regulates all the power going to the US Module. This board is attached to the US Module with 2 DIN32 Connector on each end. Dimension: 6.5” X 12” Color: Green Mask
	Component Name: ECHO MUX Board Description: 10 Layers PCB. 192 individual mechanical relays that does the switching for the active slot. Dimension: 11” X 13” Color: Green Mask

7.3.2 Power Management Components

Table 7-2: Power Management Components

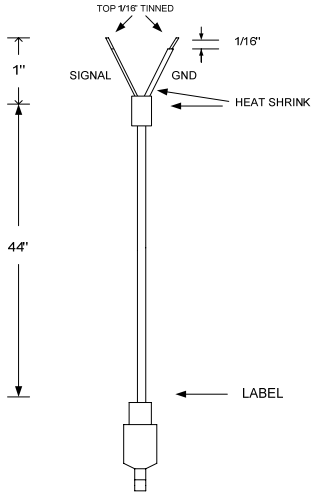
	Component Name: Isolation Transformer Description: Medical Grade Isolation Transformer is used to stabilize the input voltage. Dimension: 6.5” Diameter Color: N/A
	Component Name: Auto-Switching Power Supply Description: PC power supply that auto switches between 100V—130V and 200V—240V. Dimension: 6” X 6” X 3.5” Color: N/A
	Component Name: EMI Filter Description: Controls the input voltage. This medical grade power filter can switch between 115V and 220V. Dimension: Color:
	Component Name: Voltage Selector Description: Controls the voltage on the Isolation Transformer. Works in parallel with the EMI Filter. Both values must be the same at all time. Either 115V or 220V. Dimension: Color:
	Component Name: 3 Pos AC Receptacle Description: An addition 3 output slot for external devices connected to the SONIX. Dimension: Color:

7.3.3 Cable Components

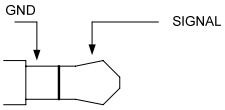
This section shows the cables inside the SONIX, such as the ones on back of the Ultrasound Modulo and the ones from the Operator Console to the Ultrasound Modulo.

Table 7-3: Cable Components

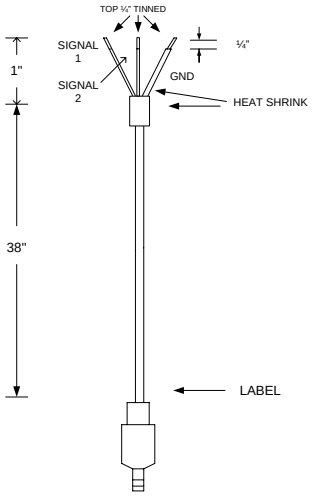
SONIXMIC: Tinned leads to Mono 3.5mm Plug



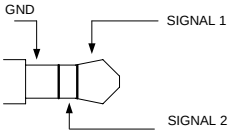
3.5mm Mono Plug



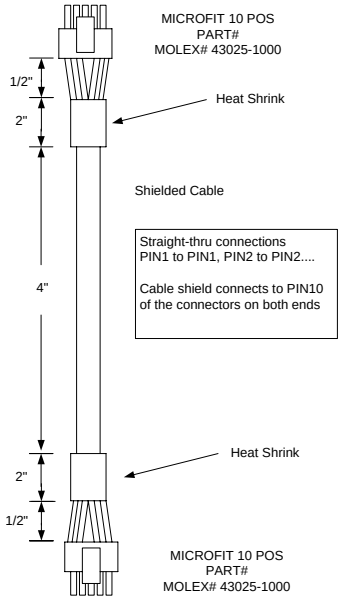
SONIXSYSPWR: Tinned leads to Stereo 3.5mm Plug



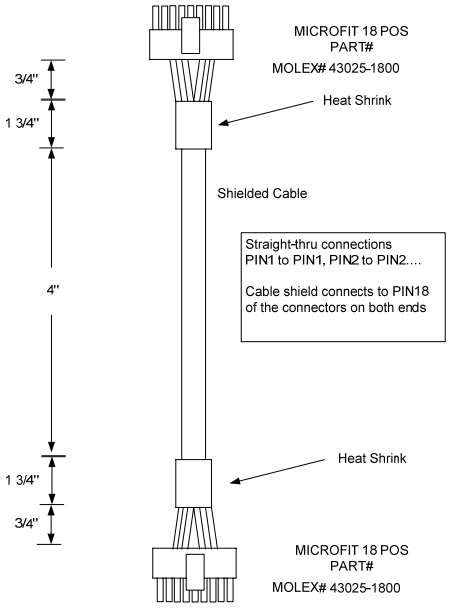
3.5mm Stereo Plug



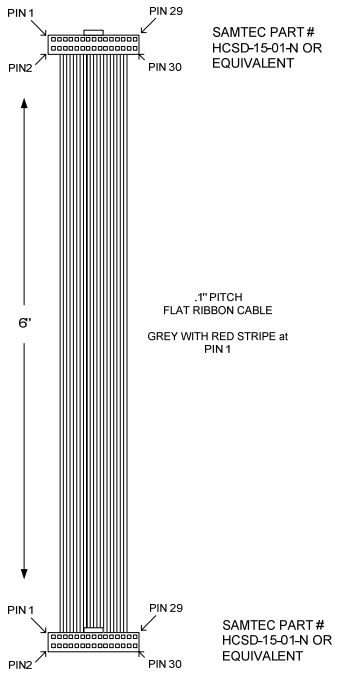
SONIXTGC: MICROFIT 10 POS to MICROFIT 10 POS



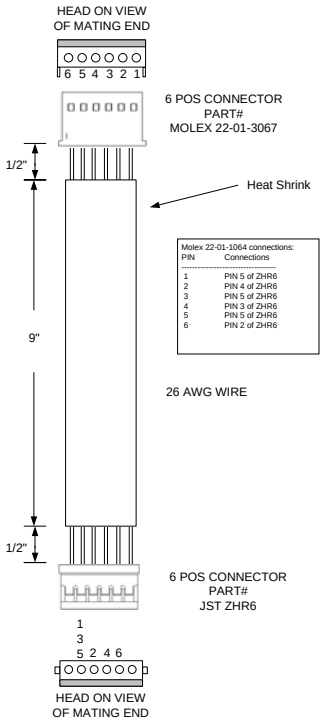
SONIXENCODER: MICROFIT 18 POS to MICROFIT 18 POS



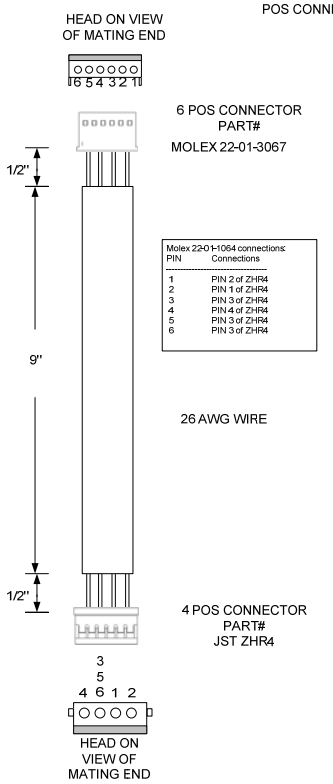
SONIXLCD: 30 POS to 30 POS RIBBON CABLE



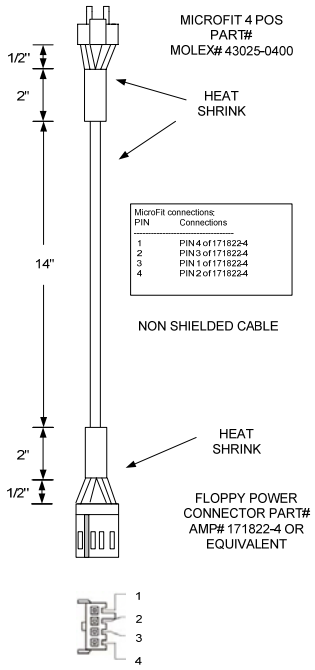
SONIXTRACKSYS1: 6 POS CONNECTOR to 6 POS CONNECTOR

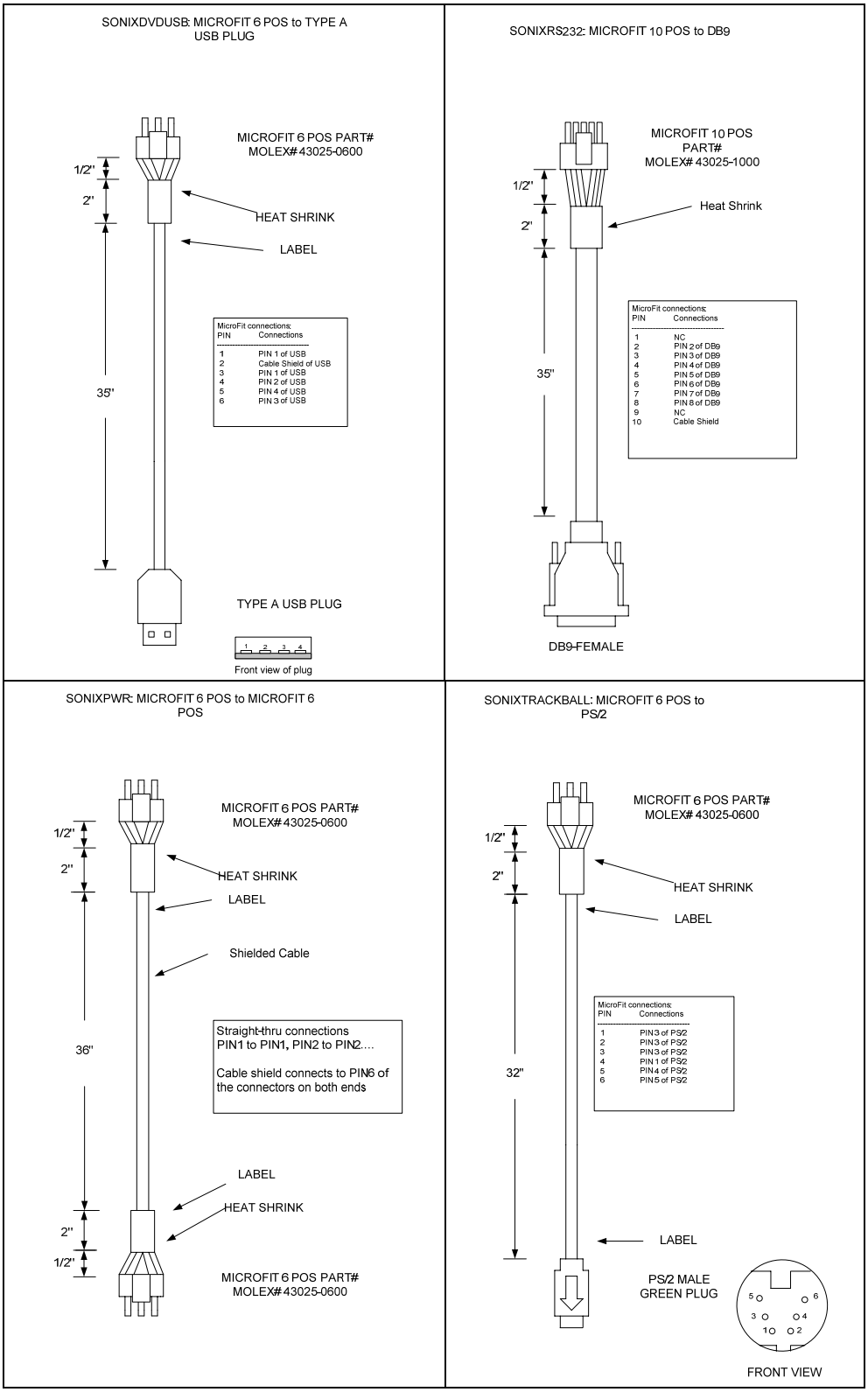


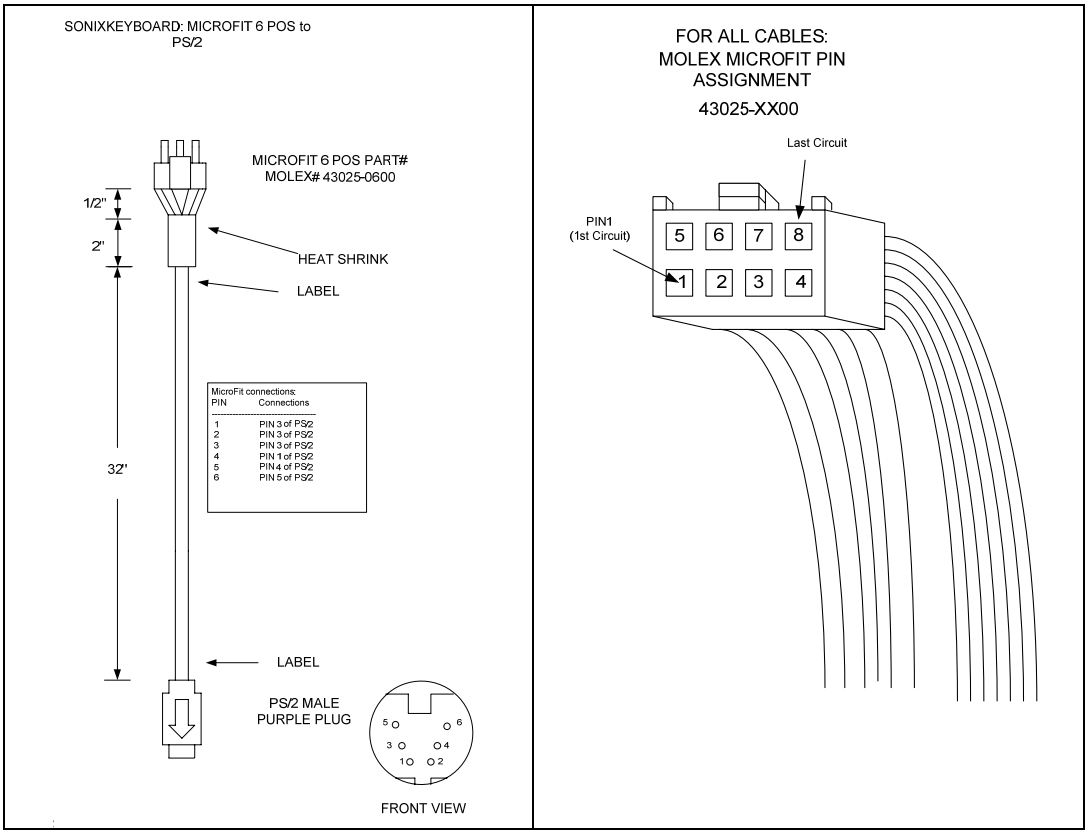
SONIXTRACKSYS2: 6 POS CONNECTOR to 4 POS CONNECTOR



SONIXDVDPWR: MICROFIT 4 POS to FLOPPY POWER CONNECTOR




SONIXDVDUSB: MICROFIT 6 POS to TYPE A USB PLUG
MICROFIT 6 POS PART# MOLEX# 43025-0600
1/2"
2"
35"
HEAT SHRINK
LABEL
MicroFit connections:
PIN Connections
1 PIN 1 of USB
2 Cable Shield of USB
3 PIN 1 of USB
4 PIN 2 of USB
5 PIN 4 of USB
6 PIN 3 of USB
TYPE A USB PLUG
1 2 3 4
Front view of plug
SONIXRS232: MICROFIT 10 POS to DB9
MICROFIT 10 POS PART# MOLEX# 43025-1000
1/2"
2"
35"
Heat Shrink
MicroFit connections:
PIN Connections
1 NC
2 PIN 2 of DB9
3 PIN 3 of DB9
4 PIN 4 of DB9
5 PIN 5 of DB9
6 PIN 6 of DB9
7 PIN 7 of DB9
8 PIN 8 of DB9
9 NC
10 Cable Shield
DB9-FEMALE
SONIXPWR: MICROFIT 6 POS to MICROFIT 6 POS
MICROFIT 6 POS PART# MOLEX# 43025-0600
1/2"
2"
36"
2"
1/2"
HEAT SHRINK
LABEL
Shielded Cable
Straight-thru connections
PIN1 to PIN1, PIN2 to PIN2....
Cable shield connects to PIN6 of the connectors on both ends
LABEL
HEAT SHRINK
MICROFIT 6 POS PART# MOLEX# 43025-0600
SONIXTRACKBALL: MICROFIT 6 POS to PS/2
MICROFIT 6 POS PART# MOLEX# 43025-0600
1/2"
2"
32"
HEAT SHRINK
LABEL
MicroFit connections:
PIN Connections
1 PIN3 of PS/2
2 PIN3 of PS/2
3 PIN3 of PS/2
4 PIN1 of PS/2
5 PIN4 of PS/2
6 PIN5 of PS/2
LABEL
PS/2 MALE GREEN PLUG
5 6 3 4 1 2
FRONT VIEW



7.3.4 Peripheral Components

The 1-position AC peripheral power cable is located in the Modulo utility panel area and can be accessed via the peripheral shelf door of the SONIX System. The connector is clearly labeled with “For use with Approved Ultrasonix Peripherals only” and is to be used for connecting third-party peripherals to the SONIX system.

Caution:	*Please use Ultrasonix certified, third-party peripherals **only** (e.g. Sony Medical Grade Black and White Video Printer Model# UP895MD; Sony Medical Grade VCR Model# SVO-9000MD). Otherwise, users have to make sure the power drawn from the 1-position AC peripheral power cable does **NOT** exceed 150W.*

7.3.5 Transducers

Table 7-4: Ultrasonix Transducers

	Component Name: Transducer Description:	4DC 6-3/40 3.5 MHz array
	Component Name: Transducer Description:	4DC7-3/40 5 MHz array
	Component Name: Transducer Description:	C5-2/60 3.2 MHz 60mm curved array.
	Component Name: Transducer Description:	C7-3/50 6 MHz 50mm curved array.
	Component Name: Transducer Description:	EC9-5/10 6.6 MHz 13mm endocavity array
	Component Name: Transducer Description:	L14-5/38 8 MHz 38mm linear array
	Component Name: Transducer Description:	L14-5W/60 8 MHz 60mm linear array
	Component Name: Transducer Description:	PA4-2/20 2.8 MHz phased array

CHAPTER 8: FIELD SERVICE COMPONENTS

8.1 INTRODUCTION

This section describes how to service the four field serviceable components: LCD display, console, ultrasound modulo, and transducer.

8.2 LCD DISPLAY SERVICING

8.2.1 Removing the Liquid Crystal Display (LCD) Display

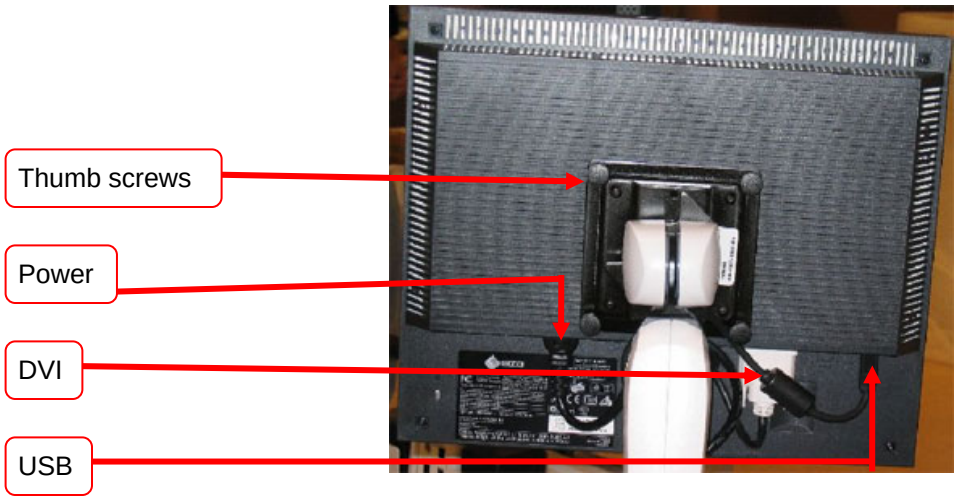
Tools required: None

1. Power off the SONIX system.
2. Unplug the three cables: Power/DVI/USB from the back of the LCD display.
3. Hold and support the LCD display in place with your arm and unscrew the four (4) thumb screws.

> ***Caution:*** *Once all the screws are off, the LCD will fall.*

4. Remove the LCD Display.

Figure 8-1: LCD Display Replacement



8.2.2 Installing the Liquid Crystal Display (LCD)

Tools required: None

1. Install the LCD with 4 thumb screws.
2. Reconnect the three (3) cables: DVI/Power/USB.
3. Press the console **MENU** button.
4. Click on ***Admin... > Peripherals > Monitor > Factory Restore*** to perform a reset on the LCD display.

8.2.3 Replacing the SX1.0 LCD Display Cables

Tools required: #2 Philips screw driver
4mm Allen key
2.5mm Allen key

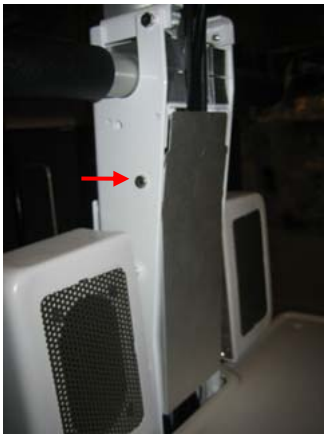
1. Power off the SONIX system and unplug it from the power outlet.
2. Remove the clip from the ergonomic arm by removing the screw, squeezing the clip, and pull it to the right.

3. Remove the back panel as per section **8.4.3 Removing the Ultrasound Modulo**, steps 5 - 7.

4. Remove the back tower case by removing the two screws and pulling from the top and bending down the bottom. The back tower case is force fitted in.

5. Remove the front tower case by removing the two screws on each side. This case pulls off easily once the screws are removed.

6. Remove the inner tower shield by removing the screws on each side.

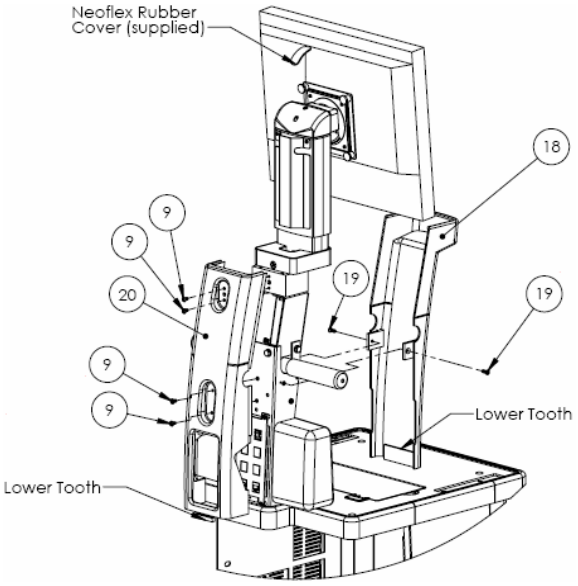


7. Once the inner shield has been removed the cables will be exposed and can easily be replaced.

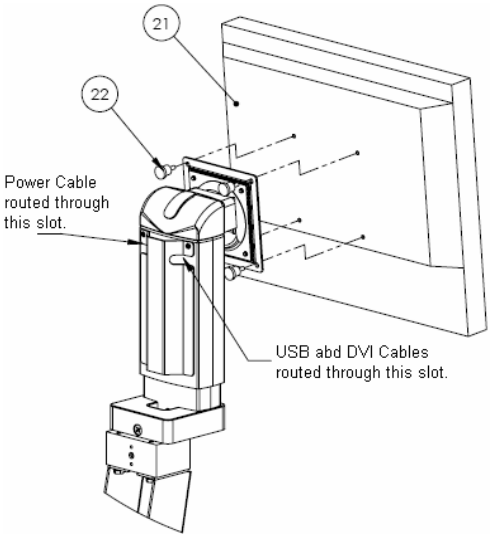
8.2.4 Replacing the SX1.1 LCD Display Cables

Tools required: #1 Philips screwdriver
#2 Philips screwdriver
2.5mm Allen key
10mm socket wrench

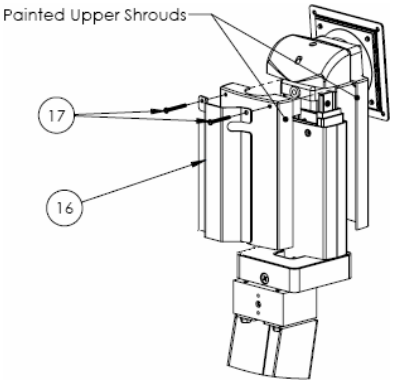
1. Power off the SONIX system and unplug it from the power outlet.
2. Remove the Rear Tower Shroud (20) using a 2.5mm Allen key to remove the four (4) Button Head Socket Screws (9).
3. Remove the Front Tower Shroud (18) using a #2 Philips screw driver to undo the two (2) Philips screws (19).



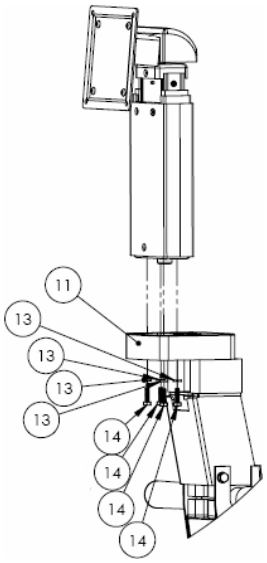
4. Undo the three (3) cables: Power, DVI and USB.
5. Undo the four (4) thumbscrews (22) and remove the LCD Display (21).



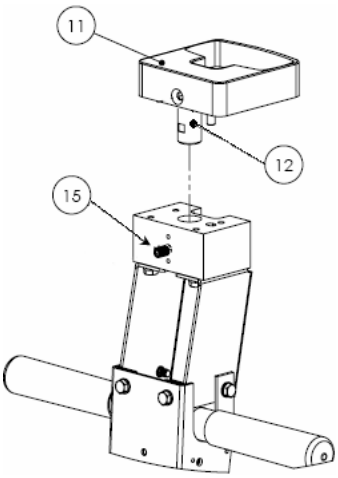
6. Use the #1 Philips screw driver and detach the two (2) screws (17) securing the Painted Upper Shroud and CM Neoflex Cableway (16).



7. In order to remove the Neoflex Arm from the CM Neoflex Upper Mount assembly (11), use the 10mm wrench to remove the four (4) Plate Screws (14) and four (4) M5 Split Lock washers (13).

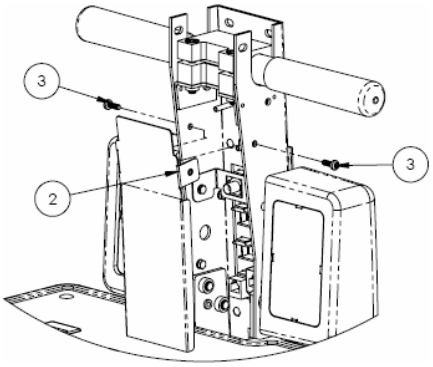


8. Loosen the set screw (15) and remove the CM Neoflex Upper Mount Assembly and Pipe (11 and 12).

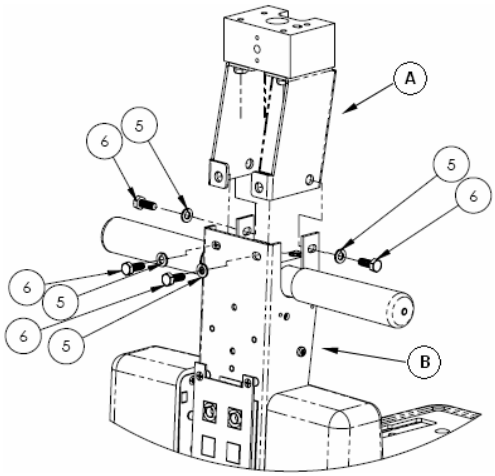


Note: *The set screw only needs to be loosened, <u>not</u> removed.*

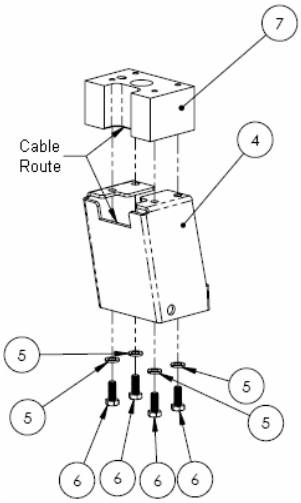
9. Use a #2 Philips screw driver and remove the two (2) Philips head screws (3). Lift off the CM Utility Panel Shield (2). All the cables are behind this shield.



10. Use the 10mm wrench and remove the four (4) washers and plate screws (5 and 6) to detach subassembly (A) from the cart (B).



11. Use the 10mm wrench and remove the four (4) washers and plate screws (5 and 6) to detach the CM Neoflex Lower Mount (7) from the CM Neoflex Adapter (4).



12. The LCD display cabling can now be removed and replaced.

8.3 CONSOLE SERVICING

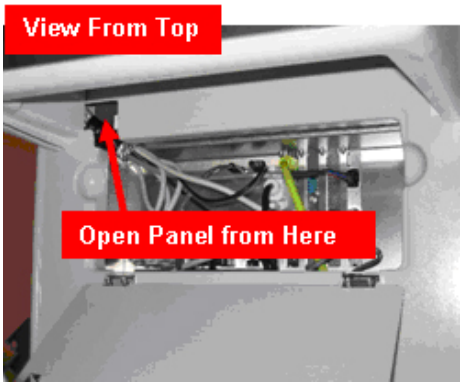
8.3.1 Removing the Console

Tools required: #2 Philips screw driver
10mm wrench
2.5mm Allen key

1. Power off the SONIX system and unplug it from the power outlet.
2. Remove the right plastic cover under the Console by unscrewing the four (4) Philips screws at the top and the two (2) Allen bolts on the right hand side.

Note: *The four (4) Philips screw covers will need to be removed first in order to access the actual screws.*

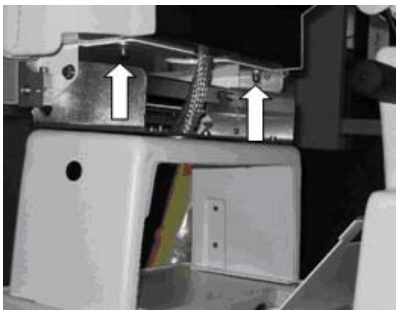
3. Unplug the cables from the Ultrasound modulo through the access panel.



Note: *Because some of the cables are not labeled, use masking tape to mark and label them.*

4. Use the 10mm wrench to remove the bolt that grounds the Console wiring harness to the Modulo.

5. Use the 10mm wrench to remove the four (4) bolts from underneath the Console.



6. Carefully pull the Console up off the mounting plate, while feeding the cable up.

8.3.2 Installing the Console

Tools required: #2 Philips screw driver
10mm wrench
2.5mm Allen key
Non-permanent Glue Stick

1. Feed the cable through the opening at the top of the assembly.
2. Plug the cables into the module through the access panel.
3. Plug in the system.
4. Start the system by pressing the console **POWER** button.
5. Ensure the system boots up.
6. Plug in a transducer.
7. Press the console **PROBE** button and select the relevant transducer from the touch screen.
8. Ensure that the system responds to the button commands and lights up correctly.

Note: *Lights are on only when there are features that are active.*

9. Once the system is working, shut it down by pressing the console **POWER** button.
10. Once system is off, unplug from back of modulo.
11. Secure the console with the four (4), 10mm hex bolts.
12. Hand-tighten the nuts.
13. Tighten the nut a half turn as you may torque the nut.
14. Place the cable along the right side of the console, which will be covered by the plastic.

Note: *There is no retaining clip, except for the plastic cover.*

15. Replace the plastic cover and secure with four (4), Philips screws (top) and two (2), Allen bolts (side).
16. Place a small amount of glue on each of the four (4) Philips screw covers and secure them to the tops of the screws.

8.4 ULTRASOUND MODULO SERVICING

8.4.1 Back-up User Data/Presets (as required)

Before you replace the Ultrasound Modulo, you must back up user data such that it can be transferred into the new Ultrasound Modulo

Equipment required: USB Memory stick or removable disk.

1. Power on the SONIX system and wait till the system fully loads.
2. Plug in a USB Memory Stick or any removable disk on to one of the USB ports in the front of the console.
3. Press the console **MENU** button.
4. Click on ***System... > Export*** to begin exporting user data. A window may pop-up to confirm your request

8.4.2 Back-up Patient Data (as required)

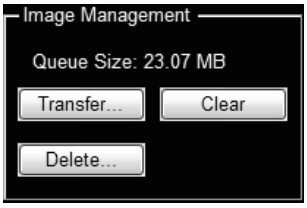
Equipment required: Writable media (CD, DVD, USB key or drive)

The image management system enables users to transfer stored images and cine clips to a storage medium (DICOM Archiver, CD, USB key, etc.).

- To select an entire study, check the checkbox for the desired study.
- To select all studies for a patient, check the checkbox for the desired patient.

To Transfer Patient Studies

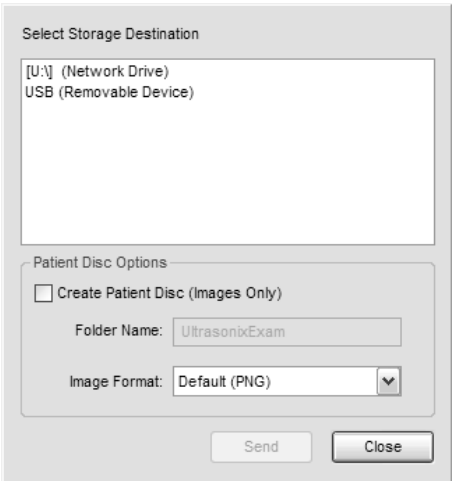
1. Power on the SONIX system and wait till the system fully loads.
2. Press the console **ID** button.
3. Select the patients to be backed up.
4. Click the ***Review*** button.
5. Select the desired patient, study date, and/or images. The amount of memory required is listed under ***Image Management section – Queue Size***.



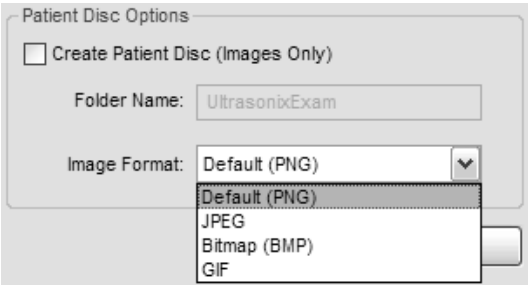
6. Insert a USB key or CD.

Note: *A list of available destinations will not display of this step is not followed.*

7. Select ***Transfer*** to access a list of available storage destinations.
8. Select the desired ***Storage Destination***.



9. Select the desired ***Image Format*** (.png, .jpeg, .bmp, .gif),



10. Select ***Send*** to transfer the files and/or images. The original files will remain unchanged in the Local memory.

8.4.3 Removing the Ultrasound Modulo

Tools required: 4mm Allen key.

1. Power off the SONIX system.
2. Disconnect all transducers from the modulo.

Note: *This is an important step as transducer connectors attach to the modulo.*

3. Unplug the system from the wall socket.
4. Remove the power cable from the back of the system.
5. Remove four (4), 4mm Allen screws from back panel.

6. Remove the back panel by pulling from the bottom.

7. With the back panel off, the modulo will be exposed. Open the top panel and remove all the cables from the modulo, taking careful note of the location of each cable connection.

8. The modulo is held in place with four (4) more 4mm Allen screws located two (2) to a side (as below).

9. Remove these four (4) screws in order to remove the modulo from the cart.
10. Before sliding out the modulo, position the cardboard/plastic shield to protect the system's plastics from scratches.

11. Slide the modulo out over the cardboard/plastic shield.

Note: *Take care to ensure the cables hanging above the modulo are not cut or damaged when sliding out the modulo. Hang the cables between the handles and the speakers to help avoid damaging them.*

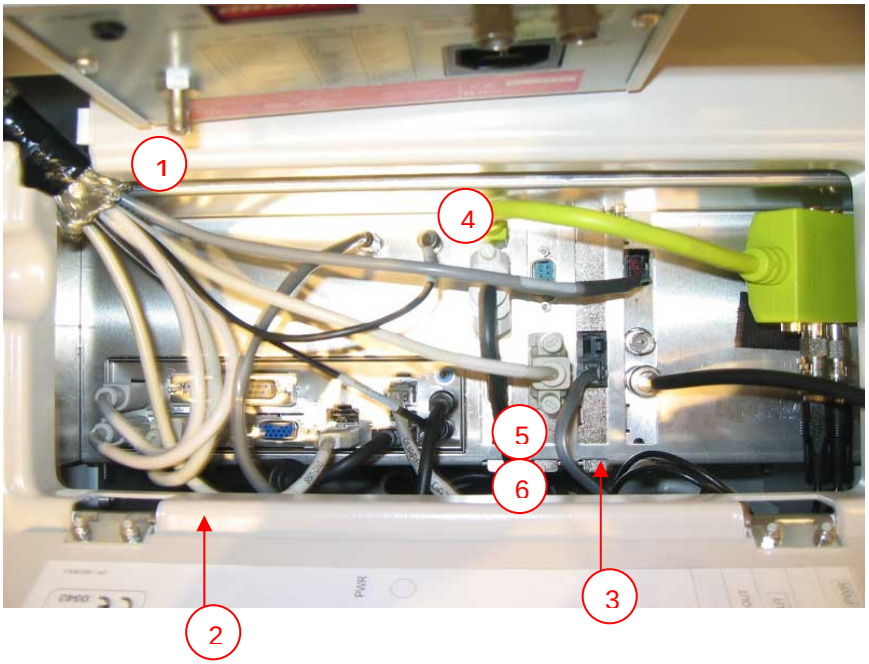
8.4.4 Installing the Ultrasound Modulo

Tools required: 4mm Allen key

1. Slide the new modulo into the rear opening with the transducer connectors facing front.

Note: *Remember to use a cardboard/plastic shield to protect the plastics.*

2. Connect all the cables from the console and tower.



Connect all cables from the console and tower. Looking from the back of the SONIX, the cables are connected as in the above image.

The group of cables located at position (**1**) comes from the console, while the second group comes from the tower. Most cables are labeled. For convenience there is a diagram of plug descriptions on the underside of the flip panel.

3. Connect the labeled cables first. The connection points of the non-labeled cables will then become self-evident.

Note: *Two (2) RS232 plugs come from the Console. One is plugged in beside the keyboard and trackball plugs at position (**2**) and the other beside the dial-up modem plug (**3**). It does not matter which one is connected to which.*

*There are three (3) Stereo-type plugs. The two (2) coming from the Console are for **Power** and **Mic** and are plugged in at positions (**4**) and (**6**). The one for the **Speakers** comes from the Ergo Arm and is plugged in at position (**5**).*

4. Plug the power cable in to the back of the modulo.
5. Plug in a transducer.
6. Start the system by pressing the console **POWER** button.
7. Ensure the system boots up.

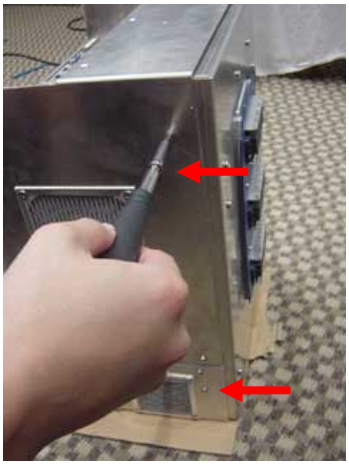
8. Press the console **PROBE** button and select the relevant transducer from the touch screen.
9. Ensure that the system is imaging properly (i.e., there are no oddities such as black lines, excessive noise, etc.).
10. Once the system is working, shut it down by pressing the console **POWER** button.
11. Once the system is off, unplug the power cable from back of the modulo.
12. Secure the modulo with the four (4), 4mm Allen screws.
13. Re-install the plastic back panel using the four (4), 4mm Allen screws.

8.4.5 Removing the Front Block

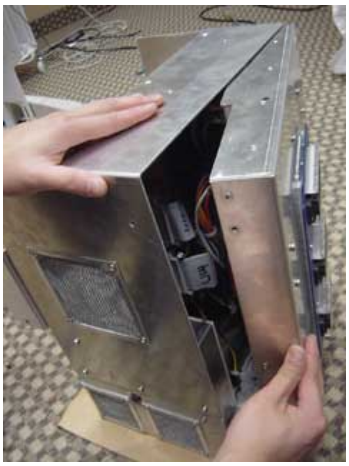
Tools Required: #2 Philips screw driver

1. To open the Front Block, remove the two (2) screws (pictured below).

Note: *Although not shown, there will be a service access sticker to indicate the correct screws.*



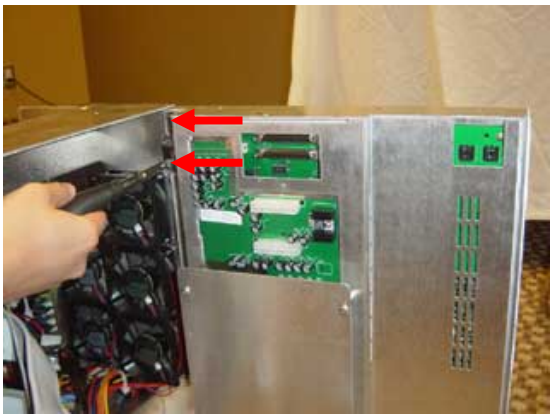
2. Swing open the Front Block door to expose the interior.



3. Remove the cables attached to the door.

Note: *Label the cables as each one is detached in order to avoid confusion during reinstallation.*

4. To remove the door, undo the four (4) screws attached to the hinge. The two (2) screws on the top hinge are marked below.

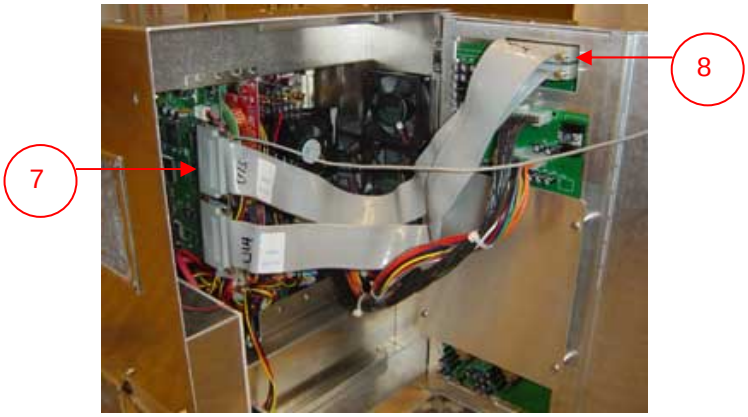


5. The Front Block can now be removed.

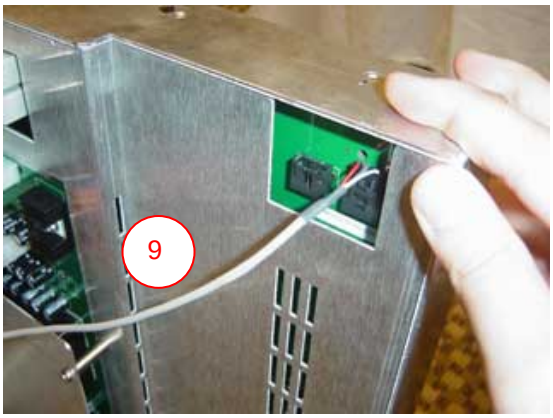
8.4.6 Replacing the Front Block

Tools Required: #2 Philips screw driver

1. Attach the new Front Block via the hinge with the four (4) hinge screws.
2. Connect the cables as below.



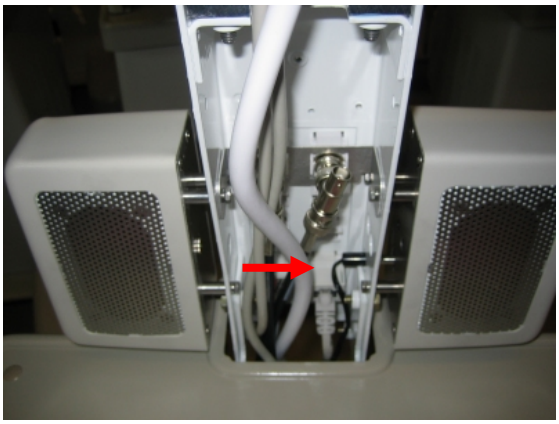
3. The 3M cables coming from the PCI card are connected in reverse. The top plug of the PCI card (**7**) is connected to the bottom plug on the ultrasound modulo (**8**). Consequently, the bottom of the PCI card is connected to the top plug on the ultrasound modulo.
4. The black and multi-colored plugs can be connected in any order.
5. Connect the power cable coming from the PCI card (**9**) to the plug on the right-hand side of the door.



6. While closing the Front Block, tuck the cables in, particularly the power cable (**9**) so that they do not hit the fans on the left and right side of the SONIX.
7. Secure the door with the two (2) service access screws.

8.4.7 Replacing the Speaker Power Cable (LCD Display Arm SX1.0)

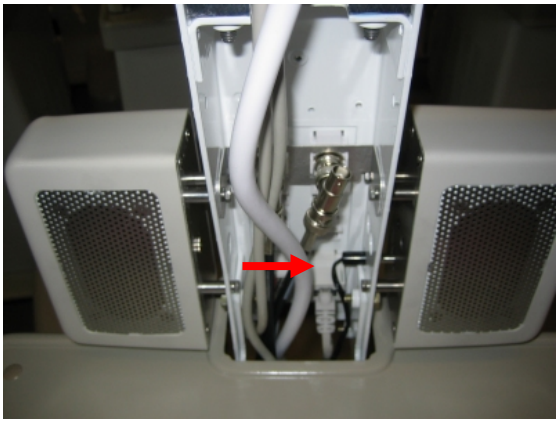
1. Remove the back panel of the SONIX as per section **8.4.3 Removing the Ultrasound Modulo**, steps 5 - 7.
2. Remove the back tower case as per section **8.2.3 Replacing the SX1.0 LCD Display Cables**, steps 5 - 7.
3. On the right-hand speaker, locate the speaker power cable.



4. Unplug the speaker power cable from both the speaker and the modulo and replace it with the new speaker power cable.

8.4.8 Replacing the Speaker Power Cable (LCD Display Arm SX1.1)

1. Remove the back panel of the SONIX as per section **8.4.3 Removing the Ultrasound Modulo**, steps 5 - 7.
2. Remove the back tower case as per section Remove the back tower case as per section **8.2.4 Replacing the SX1.1 LCD Display Cables**, steps 2, 3 and 9.
3. On the right-hand speaker, locate the speaker power cable.



4. Unplug the speaker power cable from both the speaker and the modulo and replace it with the new speaker power cable.

8.4.9 Transferring User Settings

Once the new ultrasound modulo has been installed, import the previously-saved user settings from the removable disk to this system.

Equipment Required: USB Memory stick or removable disk containing previously exported User data.

1. Power on the SONIX system and wait till the system fully loads.
2. Plug in the USB Memory Stick (or the removable disk) that contains the saved Patient data to one of the USB ports in the front of the console.
3. Press the console **MENU** button.
4. Click on ***Admin…> System*** to access ***System Settings.***
5. Click on ***Import*** to begin importing user data. A window may pop-up to confirm the request.

Note: *Do not import SONIX User Presets if the software version numbers are different. This will cause a malfunction.*

8.4.10 Re-Import *License.Key* (if necessary)

In general, it will not be necessary to reinstall license keys as the ultrasound modulo (whether for SONIX OP or SP) will have the license keys pre-installed. However, if the customer purchased *optional* license keys, re-issuing the additional licenses may be required.

Refer to **CHAPTER 11: License.Key Importation** for details on re-importing *license.key*.

8.5 TRANSDUCER SERVICING

8.5.1 Introduction

Ultrasound transducers are highly sensitive medical equipment requiring proper care and cleaning.

There are two possible sources when a client is experiencing image problems:

- transducer
- ultrasound modulo's transducer MUX board.

8.5.2 Testing the Transducer

1. Ensure the transducer is plugged in to the SONIX and has been selected via the console **PROBE** button.
2. *Gently* slide the edge of any coin along the transducer face to test for a line(s) or shadow(s) in the image on the LCD display.

3. If there is a problem, unlock the transducer and move it to a different transducer port.

> ***Caution:*** *The 4D transducer can **only** be inserted in the uppermost transducer connection port.*

4. Repeat Step 2 and check to see if there is still a line/shadow(s) in the image on the LCD display. If the line/shadow(s) in the image does not disappear, then the transducer is the problem and the transducer needs to be serviced.

8.5.3 Testing the Transducer Board

1. Unlock and remove the transducer from its current transducer port.
2. Re-attach and lock the transducer into a different transducer port.

> ***Caution:*** *The 4D transducer can **only** be inserted in the uppermost transducer connection port.*

3. Test the transducer by taking a fresh image. If the line/shadow(s) in the image disappears, then the transducer board is the problem and the ultrasound modulo rather than the transducer itself needs to be serviced.

8.6 TRANSDUCER MAINTENANCE

8.6.1 Guidelines

Ultrasonix recommends inspecting the SONIX transducers prior to each use:

- Ensure the transducers are always clean before they are used. There must be no ultrasound gel (from previous imaging), any debris, films or unusual odors present.
- Ensure there are no cracks or other damage to the transducers before they are used. Inspect the transducer surfaces for cracks and feel for cracks with finger tips as well.

Where endocavity transducers are being used in clinical applications of a semi-critical nature (e.g., trans-rectal or trans-vaginal), ensure the transducer is covered with the appropriate STERILE transducer cover/sheath which has received regulatory clearance for use.

8.6.2 Ultrasound Coupling Gels

The following ultrasound coupling gels are recommended for use with SONIX transducers:

Table 8-1: Ultrasound Coupling Gel Suppliers

Gel Name	Manufacturer	Address
Aquasonic 100	Parker Laboratories, Inc	286 Eldridge Road Fairfield, NJ, 07004 USA Ph (800) 631-8888 Fax (973) 276-9510
Clear Image	Sonotech, Inc.	774 Marine Drive Bellingham, WA 98225 USA Ph (360) 671-9121 Fax (360) 671-9024
Echo-Oil®	Echo Ultrasound	R.D. #2. Box 118 Reedsville, PA 17084 USA
Echotrack®	Echo Ultrasound	R.D. #2. Box 118 Reedsville, PA 17084 USA
Ecogel 100& 200	Echo-Med Pharmaceutical Inc.	7050 Bramalea Road Unit C58 Mississauga, ON L5S 1S9 Canada Ph (905) 405-1050 Fax (905) 405-0775

Do not use gels that contain any of the following solutions:

- Acetone
- Methanol
- Denatured ethyl alcohol
- Mineral oil
- Iodine
- Any lotions or gels that contain perfume.

If there are any questions, please contact Ultrasonix Medical Corporation.

8.6.3 Cleaning/Disinfecting Recommendations and Warnings for all Non-Invasive Transducers

Warnings:

Never sterilize the transducer with sterilization techniques such as autoclave, ultraviolet, gamma radiation, gas, steam, or heat sterilization techniques. Severe damage will result using the above sterilization techniques.

Use of precleaning solutions should be restricted to the external transducer face. DO NOT get solution on any other areas or surfaces of the transducer. This includes transducer connectors and contacts.

Some chemicals such as phenol, benzothonium chloride, pHisohex, benzoyl peroxide, hydrogen peroxide are commonly found in clinic and hospital setting, while others are found in antibacterial skin cleaners or lotions. ***Use of these chemicals will cause damage to your transducer.***

DO NOT use sterilization or disinfections methods that have not been recommended by Ultrasonix. Severe damage will result. Please contact Ultrasonix if you have any doubt about sterilization or disinfection methods.

Warning: *Any transducer suspected of being contaminated with* ***Creutzfeld Jacob*** *disease material cannot be cleaned or sterilized.*

Contact Ultrasonix Medical Corporation to obtain instructions on the proper disposal of these transducers.

Remove the ultrasound transmission gel with a soft, dry or water-moistened cloth. It is recommended that transducers are reprocessed as soon as is reasonably practical following use.

Note: *Repeated processing has minimal effect on these transducers. End of life is normally determined by wear and damage due to use. Disassembly is not required.*

8.6.3.1 Cleaning (Non-Invasive Transducers)

To clean the transducer:

1. After every patient exam, wipe the ultrasound transmission gel off the transducer.
2. Wipe the transducer and cable with a soft, dry or water-moistened cloth.
3. Wipe the transducer with either:
   - a recommended disinfectant
   - Metrizyme
   - Klenzyme
4. Remove any residue with a soft cloth moistened in water. Do not allow cleaning solutions or isopropyl alcohol to air dry on the transducer.

Table 8-2: Recommended Disinfectants for Cleaning Non-Invasive Transducers

High level disinfectant:	Low level disinfectant:
• Cidex plus ™ • Wavicide®-01 • Omnicide ™	• Sani-Cloth • T-spray

8.6.3.2 Disinfecting (Non-Invasive Transducers)

The disinfectant solution may be used in accordance with the label instructions.

Table 8-3: Recommended Disinfectants for Disinfecting Non-Invasive Transducers

High level disinfectant:	Low level disinfectant:
• Cidex plus ™ • Wavicide®-01 • Omnicide ™	• Sani-Cloth • T-spray

8.6.3.3 Sterilization (Non-Invasive Transducers)

Sterilization of transducers is not possible. Please follow the instructions for disinfection (above) instead.

8.6.3.4 Maintenance (Non-Invasive Transducers)

Cautions:

DO NOT drop the transducers.

DO NOT hit the transducers against any surface that can dislodge or damage any of the transducer components.

DO NOT pinch or kink the transducer cable.

DO NOT use a brush to clean the transducer. (Use a soft cloth.)

DO NOT immerse the transducer scan head past the first seam in any liquid.

DO NOT soak the transducer for extended periods of time.

DO NOT rinse or immerse near the strain relief.

DO NOT use coupling gels and cleaning agents that have not been recommended by Ultrasonix.

DO NOT use sterilization or disinfection methods that have not been recommended by Ultrasonix. Severe damage will result. Please contact Ultrasonix if you have any doubt about sterilization or disinfection methods. Use of non-recommended cleaning agents may cause damage to the housing and will void transducer warranties.

DO NOT use chemicals such as phenol, benzothonium chloride, pHisohex, benzoyl peroxide and hydrogen peroxide – commonly found in hospitals or clinics. These chemicals will damage the transducer.

8.6.3.5 Inspection and Testing (Non-Invasive Transducers)

Inspect the transducers prior to each use:

- Always ensure the transducers are clean before they are used. There must be no ultrasound gel (from previous imaging), debris, films, or unusual odors present.
- Ensure there are no cracks or other damage to the transducers before they are used. Inspect the transducer surfaces for cracks and feel for cracks with finger tips as well.

Cautions:

DO NOT use transducers if they are found to be cracked, damaged, or broken.

DO NOT use the transducer if transducer cable insulation is damaged, thereby exposing the wiring.

8.6.3.6 Storing and Packaging (Non-Invasive Transducers)

Always ensure the transducer is clean and disinfected before storing and/or packing it. This will help to avoid contaminating the transducer holders or the foam lining of the carrying case.

- store in one of the transducer holders
- avoid storing the transducer in areas with extreme temperatures or in direct sunlight.

After placing a transducer in its carrying case, wrap the case in bubble wrap and place the wrapped case in a cardboard box.

8.6.4 Cleaning/Disinfecting Recommendations and Warnings for all Invasive Transducers

Warnings:

Never sterilize the transducer with sterilization techniques such as autoclave, ultraviolet, gamma radiation, gas, steam, or heat sterilization techniques. Severe damage will result using the above sterilization techniques.

Use of precleaning solutions should be restricted to the external transducer face. DO NOT get solution on any other areas or surfaces of the transducer. This includes transducer connectors and contacts.

Some chemicals such as phenol, benzothonium chloride, pHisohex, benzoyl peroxide, hydrogen peroxide are commonly found in clinic and hospital setting, while others are found in antibacterial skin cleaners or lotions. ***Use of these chemicals will cause damage to your transducer.***

Avoid transducer contact with strong solvents such as acetone, freon and other industrial cleansers.

DO NOT use sterilization or disinfection methods that have not been recommended by Ultrasonix. Severe damage will result. Please contact Ultrasonix if you have any doubt about sterilization or disinfection methods.

Warning: *Any transducer suspected of being contaminated with* ***Creutzfeld Jacob*** *disease material cannot be cleaned or sterilized.*

Contact Ultrasonix Medical Corporation to obtain instructions on the proper disposal of these transducers.

Remove the ultrasound transmission gel with a soft, dry or water-moistened cloth. It is recommended that transducers are reprocessed as soon as is reasonably practical following use.

Note: *Repeated processing has minimal effect on these transducers. End of life is normally determined by wear and damage due to use.*

8.6.4.1 Cleaning (Invasive Transducers)

Disinfect the transducer prior to the first exam and every exam thereafter.

To clean the transducer:

1. Unplug the transducer.
2. Wash the transducer head and cable with soap and water to remove any protein buildup; however do not rinse or immerse the transducer near the strain relief.
3. Disinfect the transducer with one of below disinfectants:
   - Cidex plus ™
   - Wavicide®-01
   - Omnicide ™
4. Remove the transducer from the disinfectant and rinse it thoroughly with sterile water.
5. Check the transducer for any residual organic material. If the residual glutaraldehyde is higher than 10ppm, disinfect the transducer again.

Note: *Where endocavity transducers are being used in clinical applications of a semi-critical nature (e.g., trans-rectal or trans-vaginal), ensure the transducer is covered with the appropriate STERILE transducer cover/sheath which has received regulatory clearance for use.*

8.6.4.2 Disinfecting (Invasive Transducers)

The disinfectant solution may be used in accordance with the label instructions.

Table 8-4: Recommended Disinfectants for Disinfecting Invasive Transducers

High level disinfectant:
• Cidex plus ™
• Wavicide®-01
• Omnicide ™

8.6.4.3 Sterilization (Invasive Transducers)

Sterilization of transducers is not possible. Please follow the instructions for disinfection (above) instead.

8.6.4.4 Maintenance (Invasive Transducers)

Cautions:

DO NOT drop the transducers.

DO NOT hit the transducers against any surface that can dislodge or damage any of the transducer components.

DO NOT pinch or kink the transducer cable.

DO NOT use a brush to clean the transducer. (Use a soft cloth.)

DO NOT immerse the transducer scan head past the first seam in any liquid.

DO NOT soak the transducer for extended periods of time.

DO NOT rinse or immerse near the strain relief.

DO NOT use coupling gels and cleaning agents that have not been recommended by Ultrasonix.

DO NOT use sterilization or disinfection methods that have not been recommended by Ultrasonix. Severe damage will result. Please contact Ultrasonix if you have any doubt about sterilization or disinfection methods. Use of non-recommended cleaning agents may cause damage to the housing and will void transducer warranties.

DO NOT use chemicals such as phenol, benzothonium chloride, pHisohex, benzoyl peroxide and hydrogen peroxide – commonly found in hospitals or clinics. These chemicals will damage the transducer.

8.6.4.5 Inspection and Testing (Invasive Transducers)

Inspect the transducers prior to each use:

- Always ensure the transducers are clean before they are used. There must be no ultrasound gel (from previous imaging), debris, films, or unusual odors present.
- Ensure there are no cracks or other damage to the transducers before they are used. Inspect the transducer surfaces for cracks and feel for cracks with finger tips as well.

Cautions:

DO NOT use transducers if they are found to be cracked, damaged, or broken.

DO NOT use the transducer if transducer cable insulation is damaged, thereby exposing the wiring.

8.6.4.6 Storing and Packaging (Invasive Transducers)

Always ensure the transducer is clean and disinfected before storing and/or packing it. This will help to avoid contaminating the transducer holders or the foam lining of the carrying case.

- store in one of the transducer holders
- store the transducer separately from other instruments to avoid inadvertent transducer damage
- if storing the transducer in the original case or in a drawer, make sure the transducer is thoroughly dry.
- avoid storing the transducer in areas with extreme temperatures or in direct sunlight.

After placing a transducer in its carrying case, wrap the case in bubble wrap and place the wrapped case in a cardboard box.

8.6.5 Shipping Transducers for Service

Disinfect transducers before shipment (refer to sections **8.6.3.2** and **8.6.4.2** for details).

Photocopy the form on page **87**, complete it, and ***include it on the OUTSIDE of the shipping box or package***.

Ultrasonix will not open the package until this form is checked by our Receiving Department.

TRANSDUCER DISINFECTION CERTIFICATE	
This is to certify that the transducer(s) in this shipment has been disinfected as per the relevant instructions in sections (**8.6.3.2** and **8.6.4.2**) of the SONIX Service Manual. Please photocopy, complete and include this form on the OUTSIDE of the shipping box or package. The transducer package will be returned unopened if this form is not included on the outside of the box.	
CUSTOMER NAME	
HOSPITAL/CLINIC NAME	
ADDRESS	
CITY/STATE	
COUNTRY/POSTAL CODE	
TELEPHONE	
FAX	
E-MAIL	
SENDER'S FULL NAME	
SIGNATURE	

Mail the transducers to:

Ultrasonix Medical Corp.
c/o Courtney Hoffman
Wetsco, Inc.
12505-A East 55th Street
Tulsa, OK 74146
USA

Tel: 1.918.459.3844
Fax: 1.918.459.3856

Web: www.ultrasonix.com
E-mail: service@ultrasonix.com

•PLEASE SEND A COMPLETED COPY OF THIS FORM WITH YOUR PACKING SLIP•
(ATTACHED TO THE OUTSIDE OF THE BOX)

CHAPTER 9: DICOM SETUP

9.1 INTRODUCTION

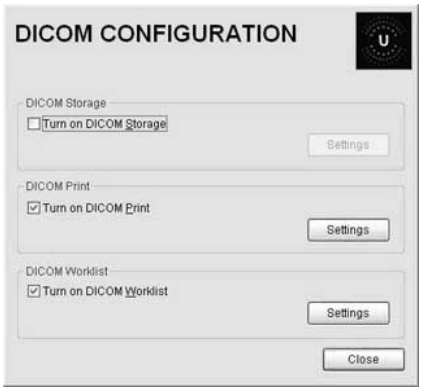
The system uses the Digital Imaging and Communications in Medicine (DICOM) standard to share medical information with other digital imaging systems. The SONIX, by means of the DICOM protocol, communicates with Storage, Storage Commitment, Print and Modality Worklist Service Class Providers. The following is a guide on how to configure these DICOM components. Selecting/deselecting a checkbox that corresponds with a specific component will turn on/off that component. Once it has been selected, a component's advanced settings may be modified by clicking the corresponding ***Settings*** button.

9.2 DICOM CONFIGURATION

1. Ensure the network is connected via a CAT5 cable at the back of the system.

Note: *Check with local IT support to ensure that the jack from the wall is live.*

2. Press the console **MENU** button.
3. Click on ***Admin…> DICOM*** to access the DICOM Configuration page with a section for each of the DICOM features (***Storage***, **Print**, **Worklist**).
4. To activate/deactivate access to a DICOM feature, select/de-select the appropriate "***Turn on…"*** check box beside the desired feature.



Note: *The **Settings** button(s) becomes available when that DICOM feature is activated.*

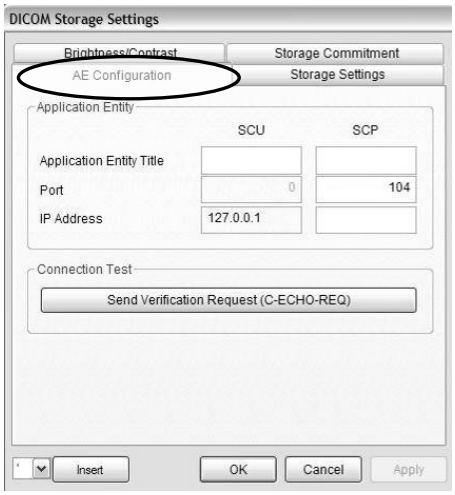
9.2.1 DICOM Storage Configuration

The ***DICOM Storage Settings*** pages offer basic and advanced settings for configuring the SONIX system for DICOM Image Storage.

To configure the DICOM storage setting:

1. Select ***Settings*** next to the "Turn on DICOM Storage" checkbox on the DICOM configuration screen.
2. An onscreen menu with four (4) tabs to configure appears on the screen:
   - AE (Application Entity) Configuration
   - Storage Settings
   - Brightness/Contrast
   - Storage Commitment

The DICOM Storage ***AE Configuration*** property page enables configuration of Application Entity properties:



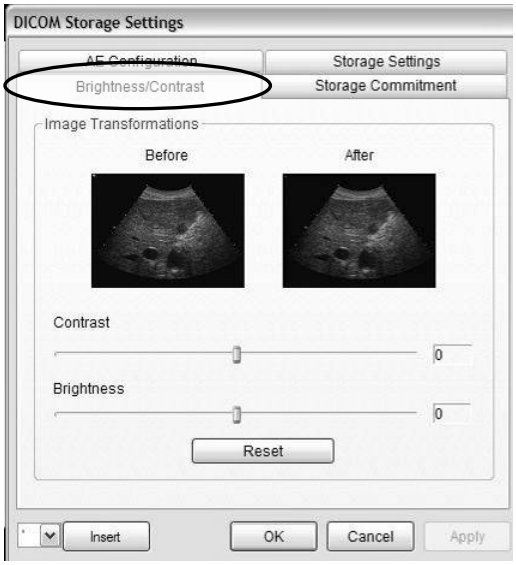
Local Host Properties (SCU – Service Class User) – <u>SONIX system</u>	
Application Entity (AE) Title	AE Title of the SONIX system
Port	Listening port of the SONIX system (unused).
IP Address	Unique identifier of the SONIX system (for information only).

Remote Host Properties (SCP – Service Class Provider)	
Application Entity (AE) Title	AE Title of the Storage SCP.
Port	Listening port of the Storage SCP.
IP Address	Unique identifier of Storage SCP.
Connection Test	Select to send verification request to DICOM storage device (ping to verify connection).
Insert (Symbol)	Insert text symbol(s) not available from console keyboard.

The DICOM ***Storage Settings*** property page specifies how images are stored:

Store Grayscale Images	Select to store images as grayscale images.
Convert BGR to RGB	Select to swap the color components of the image pixel data—the blue colors are swapped with the red colors.
Lossy Compression Quality	Select the quality (1%–100%) of image compression.
Storage Location	Select the image storage location (local or remote folder directory) where the images will be stored. ***Note:*** *If a value is specified, the AE Configuration and Storage Commit pages are disabled – images can not be stored to a SCP.*
Script Location	Select the location of a script that will be run immediately before images are stored (e.g. a script to run filters on images before storing them).
Show Error Balloons	Select to ensure system messages are displayed on the screen that inform user about DICOM image storage issues (i.e., "failed to connect to DICOM).
Insert (Symbol)	Insert text symbol(s) not available from console keyboard.

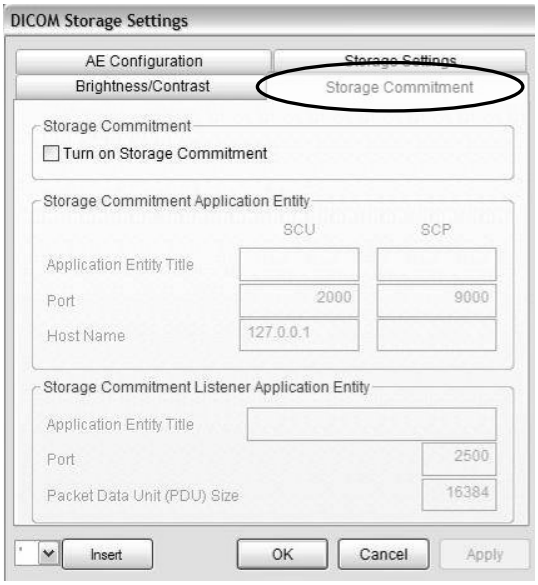
The DICOM Storage ***Brightness/Contrast*** property page changes the brightness and contrast settings. These settings are applied to the images that are sent to the SCP not the images stored locally. The effects of these settings can be seen in the *Before* and *After* images.



Contrast	Adjusts the level of contrast applied to the images.
Brightness	Adjusts the level of brightness applied to the images.
Reset	Resets the values of the DICOM storage contrast and brightness back to zero.
	Note: *To adjust the brightness/contrast settings, position the trackball arrow over the brightness or contrast slider, hold down the* ***Select*** *button at the same time as moving the trackball left or right to the desired position.*

The DICOM ***Storage Commitment*** property page enables configuration of the Storage Commitment AE.

Check "***Turn on Storage Commitment"*** to enable Storage Commitment feature.



Local Host Properties of Storage Commitment* SCU** *(Service Class User)* **– *SONIX system:	
SCU AE Title	AE Title of the SONIX system.
SCU Port	Listening port of the SONIX system.
SCU Host Name	Host name of the SONIX system SCU (for information only).

***Remote Host Properties* SCP** *(Service Class Provider):*	
SCP AE Title	AE Title of the Storage Commitment SCP
SCP Port	Listening port of the Storage Commitment SCP.
SCP Host Name	Host name of the Storage Commitment SCP

Storage Commitment Listener AE:	
AE Title	AE title of the Storage Commitment Listener SCU.
Port	Listening port
Packet Data Unit (PDU) Size	PDU size in bytes.
Insert (Symbol)	Insert text symbol(s) not available from console keyboard.

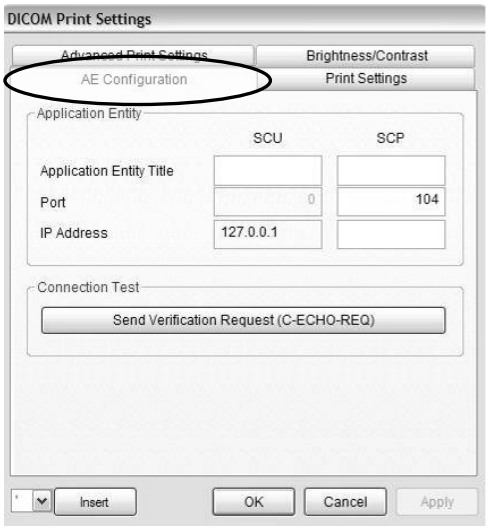
9.2.2 DICOM Print Configuration

The ***DICOM Print Settings*** pages offer basic and advanced settings for configuring the SONIX system for DICOM Print.

To configure the DICOM print setting:

1. Select ***Settings*** next to the "***Turn on DICOM Print***" checkbox.
2. An onscreen menu with four (4) tabs to configure appears on the screen:
   - AE Configuration
   - Print Settings
   - Advanced Print Settings
   - Brightness/Contrast

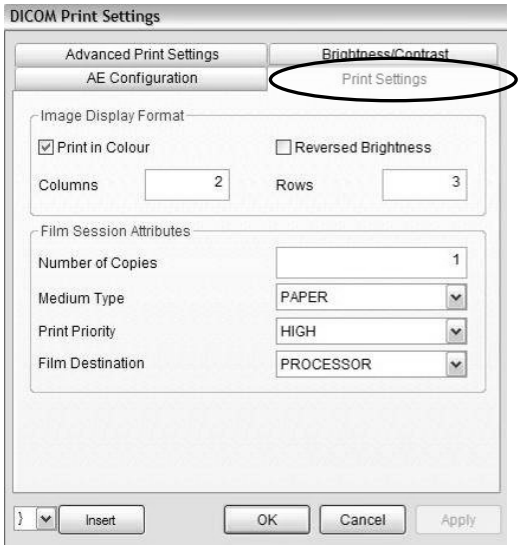
The DICOM ***Print AE Configuration*** property page enables configuration of Application Entity properties:



Local Host Properties SCU (Service Class User) – SONIX System	
Application Entity (AE) Title	AE Title of the SONIX system
Port	Listening port of the SONIX system (unused).
IP Address	Unique identifier of the SONIX system (for information only).

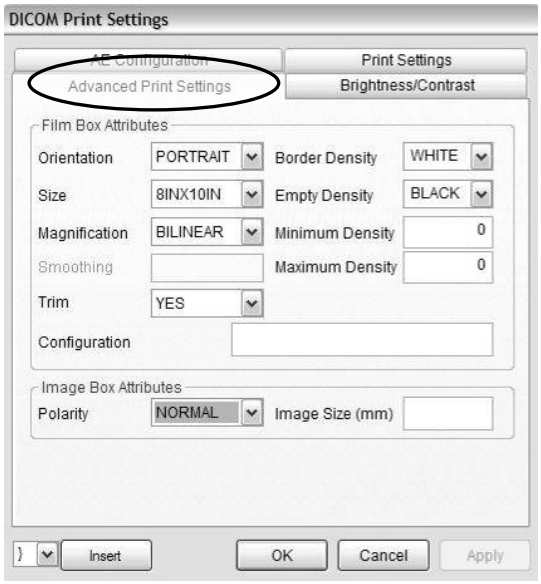
Remote Host Properties SCP (Service Class Provider)	
Application Entity (AE) Title	AE Title of the Print SCP.
Port	Listening port of the Print SCP.
IP Address	Unique identifier of Print SCP.
Connection Test	Select to send verification request to DICOM print device (ping to verify connection).
Insert (Symbol)	Insert text symbol(s) not available from console keyboard.

The ***Print Settings*** property page enables configuration of general print properties**:**



Print in Color	Select to print images in color, otherwise they are printed in grayscale. Default is unchecked (print in grayscale)
Reversed Brightness	Select to print images in reversed brightness.
Columns	Select the number of columns per page.
Rows	Select the number of rows per page.
Number of Copies	Select the number of copies of each page to be printed.
Medium Type	Select the type of medium that images are printed on (Paper, Clear Film or Blue Film).
Print Priority	Select the print job priority (High, Medium or Low).
Film Destination	Select the location print is sent to (processor or magazine).
Insert (Symbol)	Insert text symbol(s) not available from console keyboard.

The ***Advanced Print Settings*** property page enables configuration of advanced print properties:

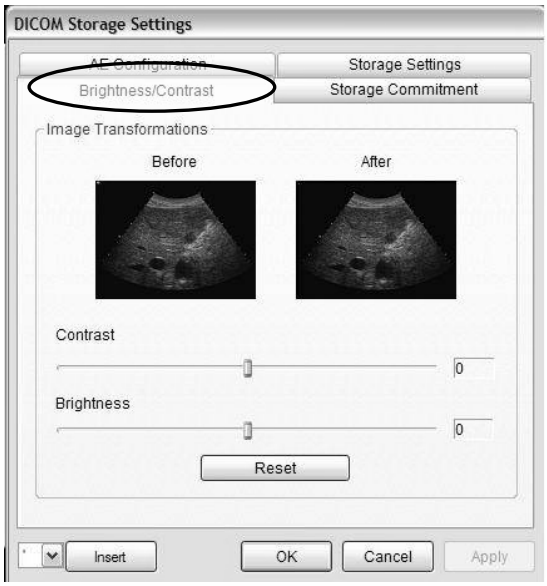


Orientation	Select the orientation of the print page.
Size	Select the size of the print page.
Magnification	Select the method of magnification used.
Smoothing	Select the smoothing. Printer specific – only available if Cubic Magnification is selected.
Trim	Select Yes or No to use a border (trim) on each page.
Border Density	Enter the border density in hundredths of OD.
Empty Density	Enter the empty density in hundredths of OD.
Minimum Density	Enter the minimum image density.
Maximum Density	Enter the maximum image density.
Configuration Information	Enter printer specific configuration information.
Polarity	Enter the type of polarity to be used.
Image Size	Printer specific image size in mm.
Insert (Symbol)	Insert text symbol(s) not available from console keyboard.

The DICOM Print ***Brightness/Contrast*** property page changes the brightness and contrast settings:

These settings are applied to the images that are sent to the SCP not to the images stored locally.

The effect of these settings can be seen in the ***Before*** and ***After*** images



Contrast	Adjusts the level of contrast applied to the images.
Brightness	Adjusts the level of brightness applied to the images.
Reset	Resets the values of the DICOM print contrast and brightness back to zero.
	Note: *To adjust the brightness/contrast settings, position the trackball arrow over the brightness or contrast slider, hold down the* ***Select*** *button at the same time as moving the trackball left or right to the desired position.*

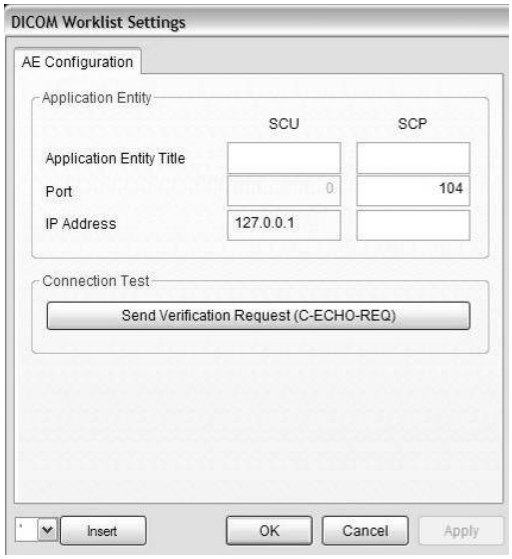
9.2.3 DICOM Worklist Configuration

The ***DICOM Worklist Settings*** pages offer advanced settings for configuring the DICOM Worklist SCU (Service Class User).

To configure the DICOM Worklist settings:

1. Select Settings next to the “Turn on DICOM Worklist” checkbox.
2. An onscreen menu with two tabs appears on the display to configure:
   - AE Configuration

The DICOM Worklist ***AE Configuration*** property page enables configuration of Application Entity properties.



Local Host Properties SCU (Service Class User) – SONIX System	
Application Entity (AE) Title	AE Title of the SONIX system.
Port	Listening port of the SONIX system (unused).
IP Address	Unique identifier of the SONIX system (for information only).

Remote Host Properties SCP (Service Class Provider)	
Application Entity (AE) Title	AE Title of the Worklist SCP.
Port	Listening port of the Worklist SCP.
IP Address	Unique identifier of Worklist SCP.
Connection Test	Select to send verification request to DICOM Worklist device (ping to verify connection).
Insert (Symbol)	Insert text symbol(s) not available from console keyboard.

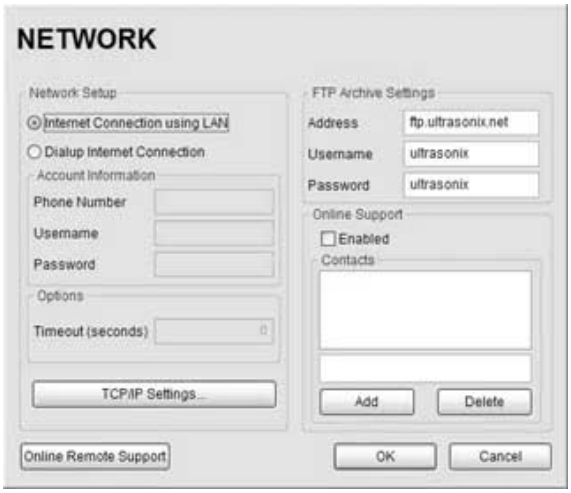
CHAPTER 10: NETWORK CONNECTION

10.1 INTRODUCTION

The SONIX system can be configured to connect to the local network. In order for the network connection to function properly, please ask the IT department for assistance.

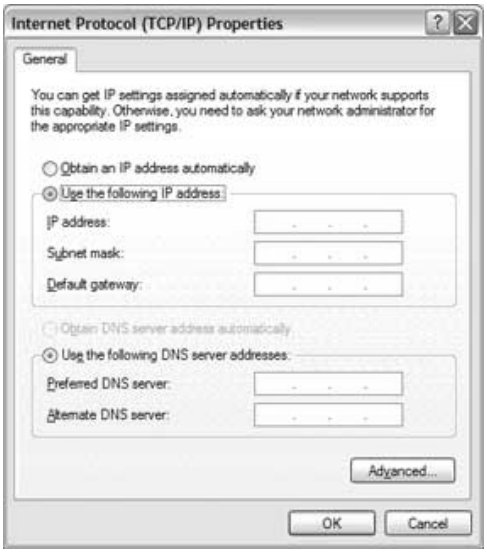
10.2 SETTING UP THE NETWORK CONNECTION

1. Press the console **MENU** button.
2. Click on ***Admin…> Network > TCP/IP Settings***.



Note: *Ask the IT department for the correct* ***TCP/IP settings*** *for the SONIX system.*

3. Under ***General***, select ***Obtain an IP address automatically*** or ***Use the following IP address*** and enter the assigned static ***IP address***, ***Subnet mask***, and ***Default gateway***.



4. Click ***OK*** to submit the changes.

10.3 ONLINE REMOTE SUPPORT

Online remote support allows Ultrasonix Technical Support to view and control the SONIX for diagnostic purposes.

1. Press the console **MENU** button.
2. Click on ***Admin…> Network > Online Remote Support***.
3. Enter the PIN provided by Ultrasonix Technical Support.
4. When prompted, run the programs that need to be installed.
5. The SONIX can now be remotely controlled.

CHAPTER 11: LICENSE.KEY IMPORTATION

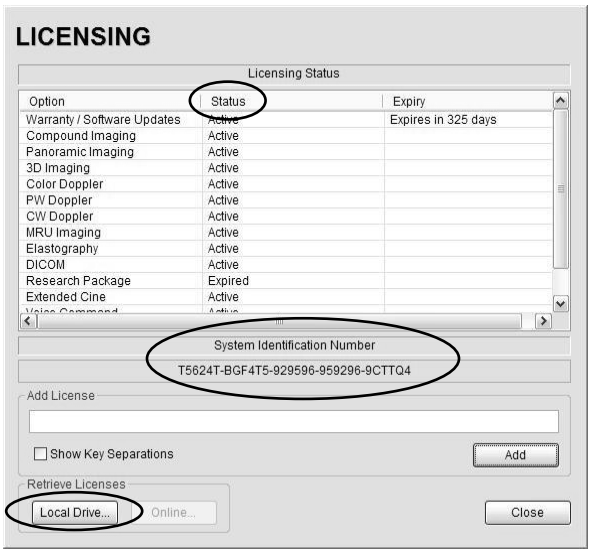
11.1 INTRODUCTION

When a new software version is installed, it may be necessary to re-import the *license.key* file in order to have full functionality.

Equipment Required: USB Memory stick or removable disk.

11.2 RE-IMPORT *LICENSE.KEY* FROM A USB MEMORY STICK OR REMOVABLE DISK

1. Press the console **MENU** button to access ***User Settings***.
2. Click on ***Admin…> Licensing*** .
3. Make note of the ***System Identification Number*** shown in the ***Licensing*** window.

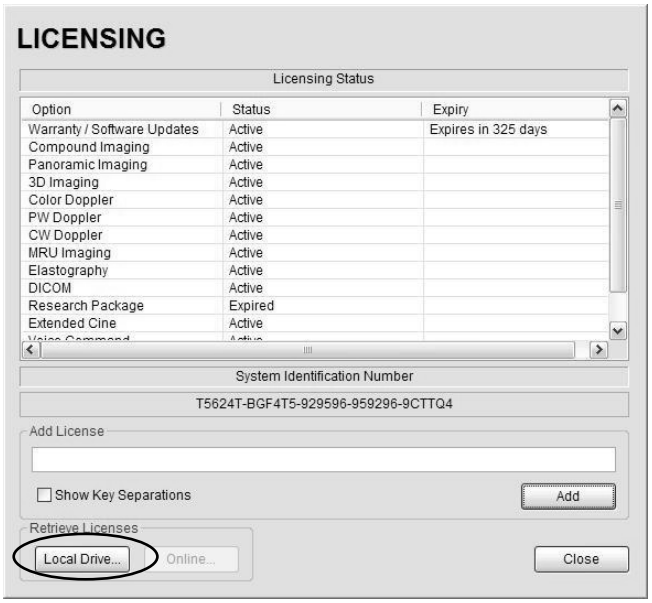


4. Forward the ***System Identification Number*** to Ultrasonix to obtain a *license.key* file
5. When the *license.key* file arrives, copy it to a USB Memory stick.
6. Copy and paste the new *license.key* file onto the D: Drive.
7. Press the console **MENU** button to access ***User Settings***.
8. Click on ***Admin…> Licensing > Local Drive***.
9. Go to D: Drive and locate the *license.key* file.
10. Click ***Open*** and the Licenses should be active.

Note: *If there are any problems, clear all menus, return to* ***Licensing*** *page and contact Ultrasonix Technical Support for assistance.*

11.3 RE-IMPORT *LICENSE.KEY* FROM A LOCAL DRIVE

1. Press the console **MENU** button to access the ***User Settings*** menu.
2. Select ***Admin… > Licensing***.
3. Click on ***Local Drive***.



4. Under the ***Look in*** drop-down menu, select ***Local Disk (D:)*** and locate *license.key*.

5. Click ***Open*** to re-import *license.key*.

Note: *If there are any problems, contact Ultrasonix Technical Support for assistance.*

CHAPTER 12: COMPLETE PLASTICS REPLACEMENT

12.1 INTRODUCTION

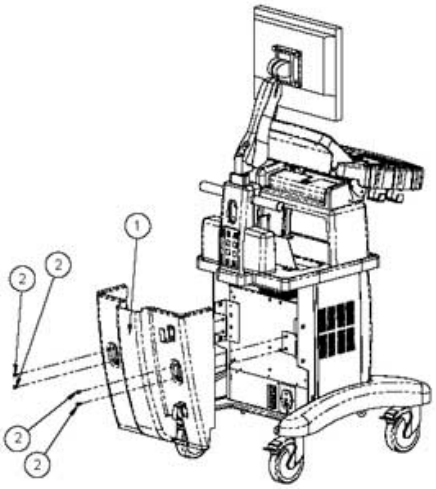
This section describes how to disassemble the SONIX System mainly to replace the plastic covers.

Tools required: 2.5mm Allen key
4mm Allen key
#1 Philips screwdriver
#2 Philips screwdriver
10mm wrench

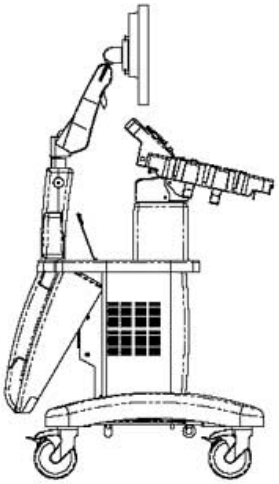
12.2 REAR PLASTIC COVER REMOVAL

To Remove the Rear Plastic Cover:

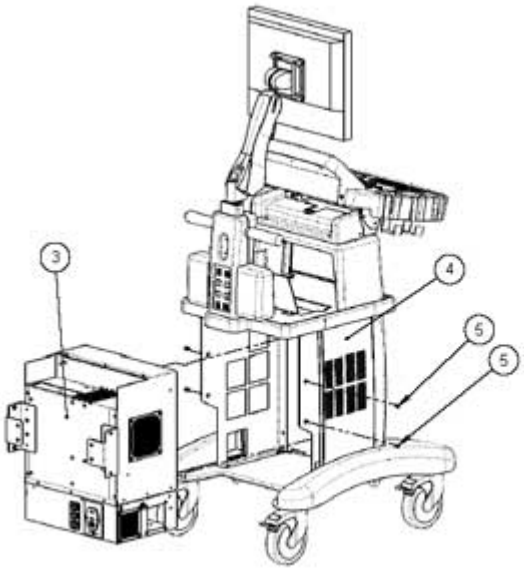
1. Remove the rear plastic cover (1) from the back of the SONIX system by removing the four screws (2).



2. Remove the rear plastic cover by sliding out the bottom first as per the diagram below.



3. To slide the Ultrasound Modulo (3) out of the SONIX system (4), remove the two screws (5) located on each side of the SONIX system. A total of four screws. Please remember to detach all cables and transducers from the Ultrasound Modulo.

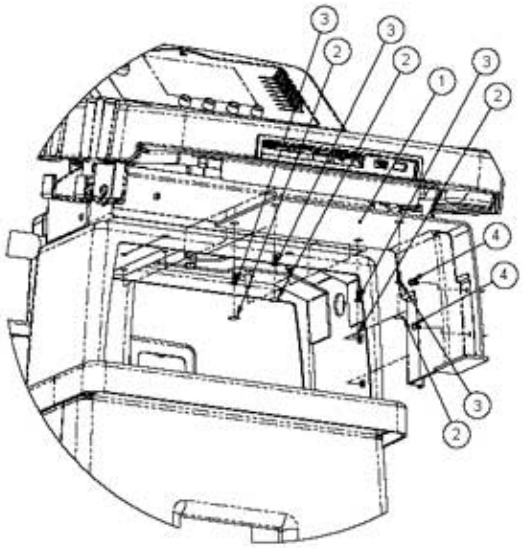


12.3 CONSOLE SUPPORT PLASTICS REMOVAL

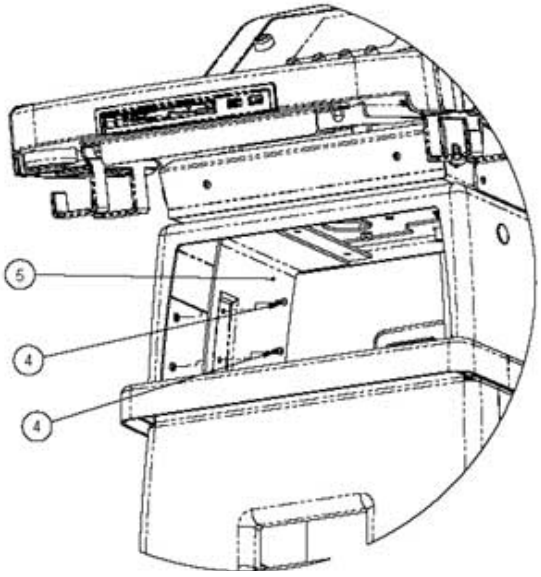
To remove the Console Support Plastics, follow the instructions in sections **12.3.1** and **12.3.2**.

12.3.1 Inner Console Support and Console Assembly Plastics Removal

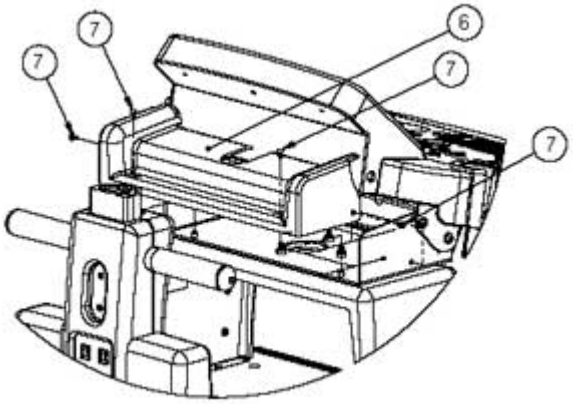
1. To remove the Left Inner Console Support Plastic (1) from the assembly, remove the four tap caps (2) off the screws located at the top. Remove the four screws (3).
2. Remove the two screws (4) and the Left Inner Console Support Plastic can be removed.



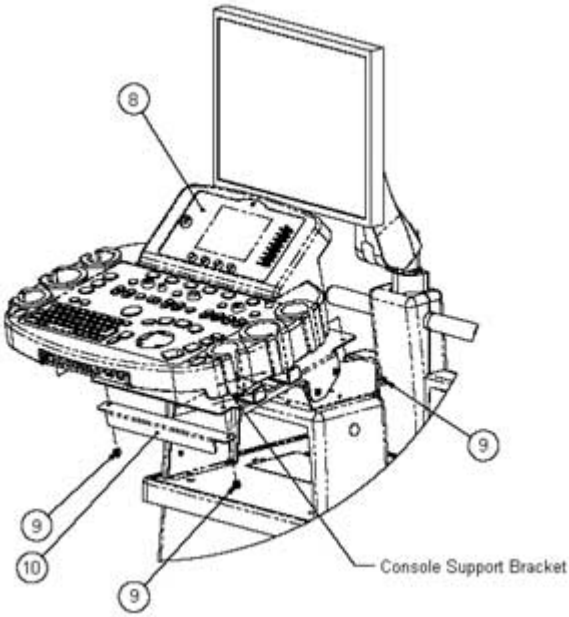
3. To remove the Right Inner Console Support Plastic (5) from the assembly, remove the two screws (4).



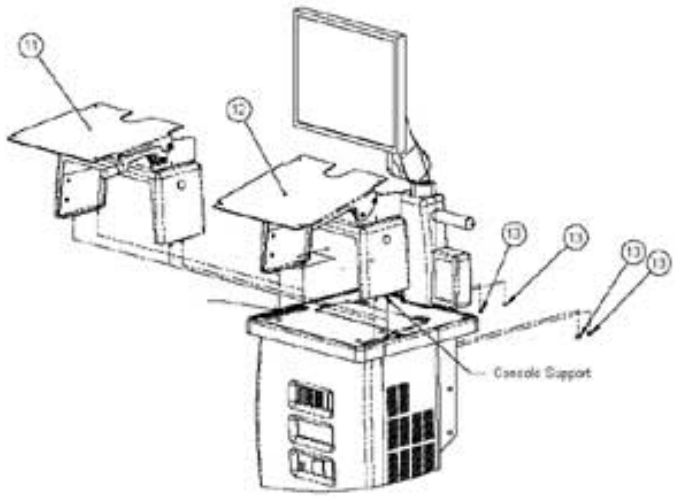
4. Remove the Cart Hinge Plastic (6) from the assembly by removing the four screws (7).



5. To detach the Console assembly (8), remove two screws at the rear of the tech board (9).
6. Detach the Front Handle (10) by removing the two screws (9). At this point, the Console assembly can be removed.

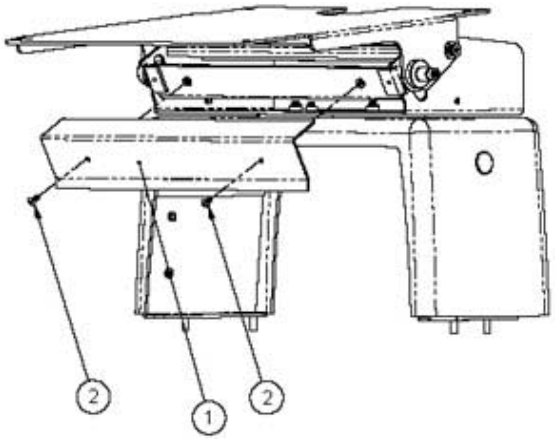


7. Remove the Console Support from the assembly. There are two types of Console Support: one for SP/RP model and one for OP model:
   a. To remove the Console Support SP/RP (11) from the assembly, remove the 4 screws (13).
   b. To remove the Console Support OP (12) from the assembly. Remove the 4 screws (13).

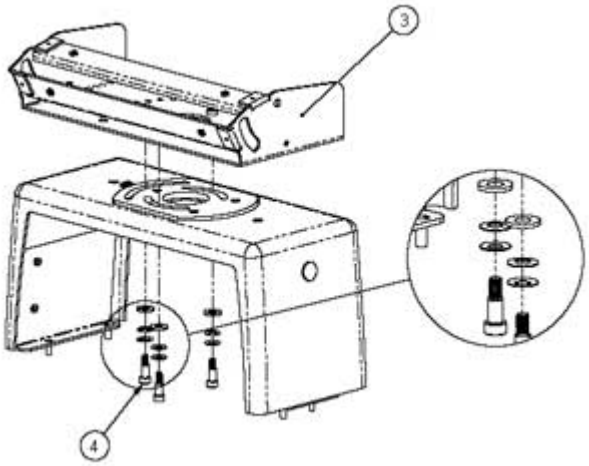


12.3.2 Console Support Outer Plastic Removal

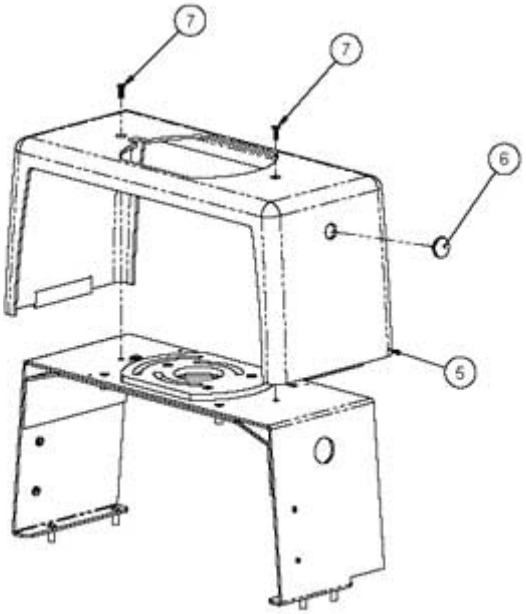
1. Remove the Cart Hinge Front Cover (1) from the Console Support by removing the two screws (2).



2. Remove the Cart Hinge Bracket (3) from the assembly by unscrewing the three screw/washer combinations (4).

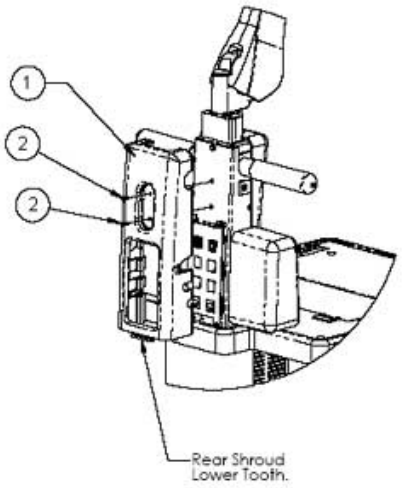


3. Remove the Finishing Plug (6) from the Console Support Outer Plastic (5). Then remove the two screws (7) and the Console Support Outer Plastic can be detached.

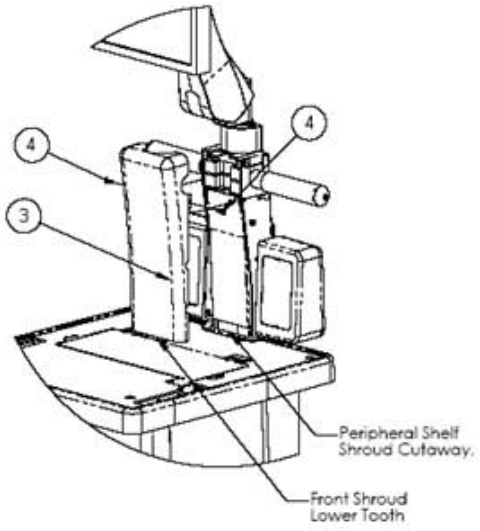


12.4 LCD DISPLAY TOWER PLASTICS REMOVAL

1. Remove the Rear Tower Plastic (1) by removing the two screws (2). Note: unclip the lower tooth on the Rear Tower Plastic.



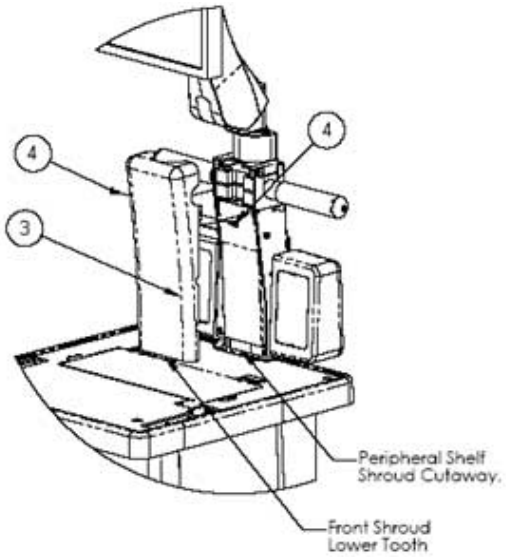
2. Remove the Front Tower Plastic (3) by removing the two screws (4).



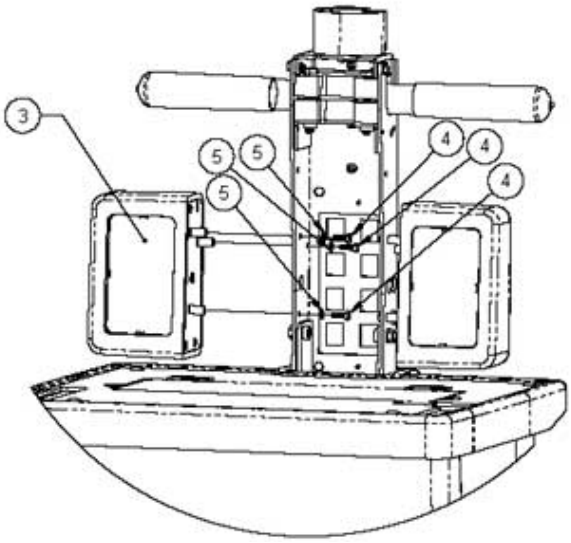
Note: *Unclip the lower tooth on the Front Tower Plastic.*

12.5 SPEAKER REMOVAL

1. Remove the Panel Shield (1) by removing the two screws (2).

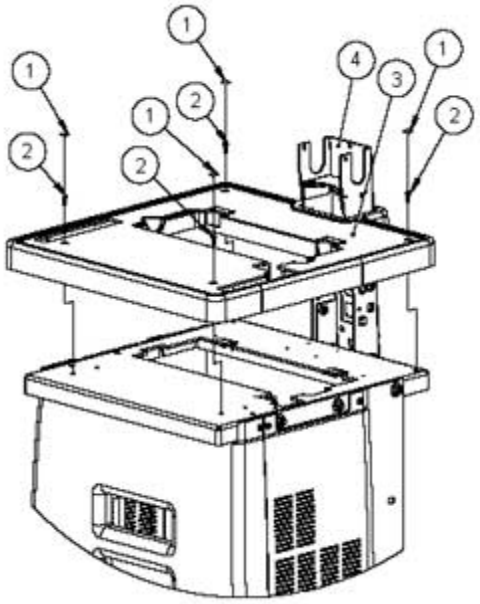


2. For each Speaker, unscrew the three screws (4) along with their lock washers (5). Remove the Speakers (3).

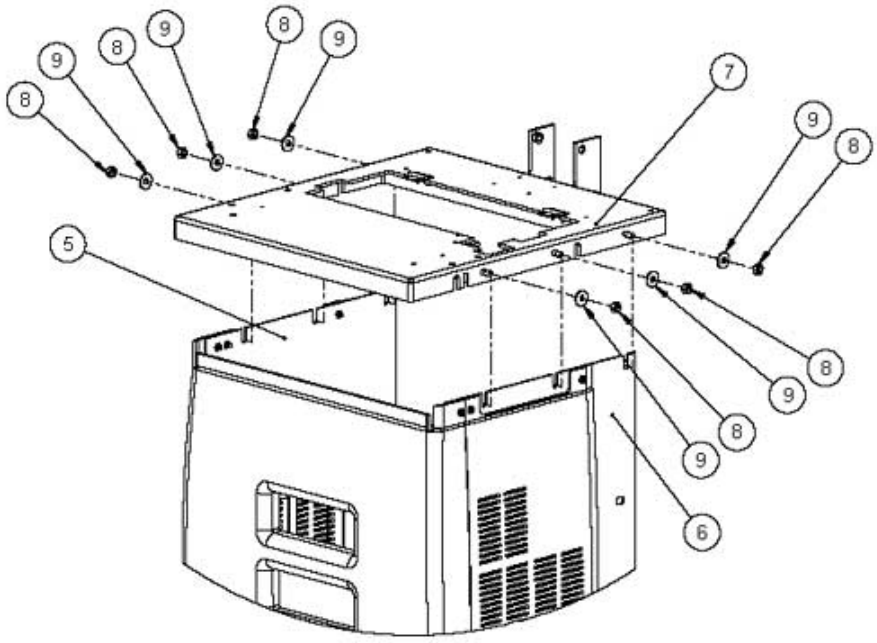


12.6 BODY PLASTICS REMOVAL

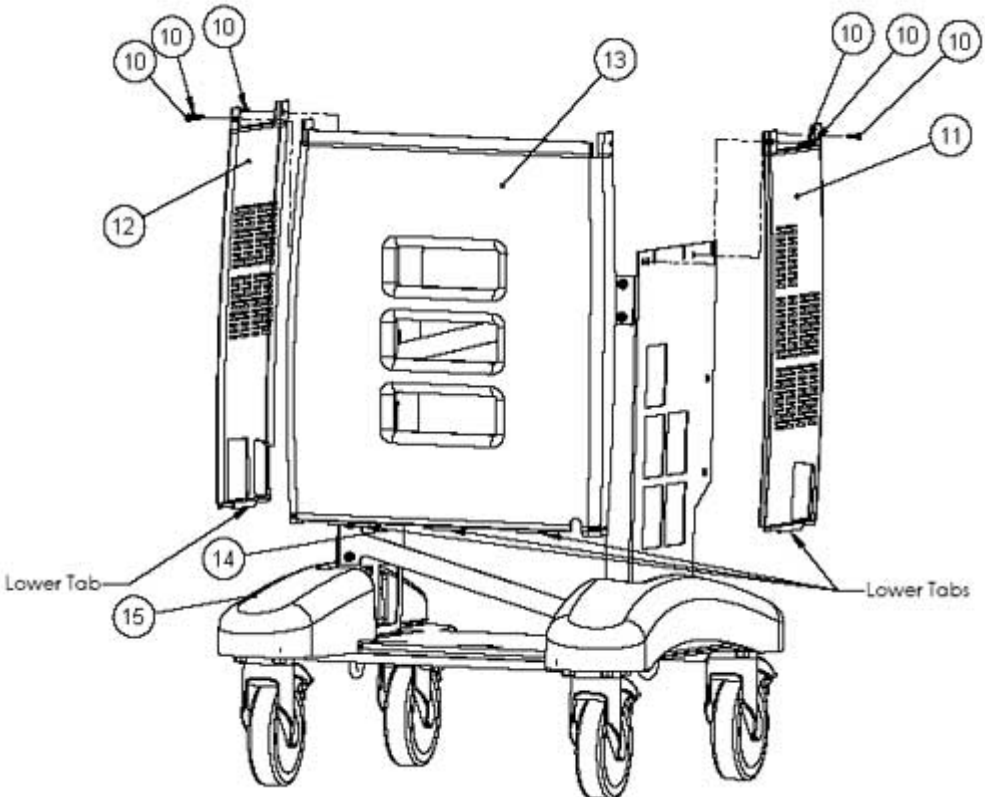
1. Remove the four tap caps (1) off the four screws.
2. Remove the four screws (2) from the Peripheral Shelf Plastic.
3. Slide the Peripheral Shelf Plastic (3) over top of the LCD Display Tower Weldment (4).



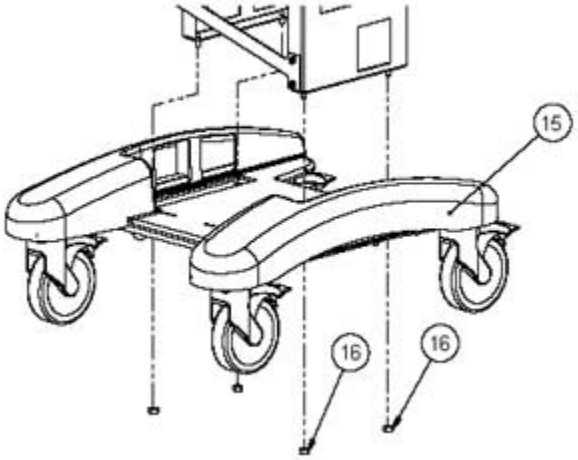
4. For the Left and Right Structures (5,6), on each side, remove the three screws (8) with the washer fenders (9) from the Peripheral Shelf Assembly.
5. Remove the Peripheral Shelf Assembly (7).



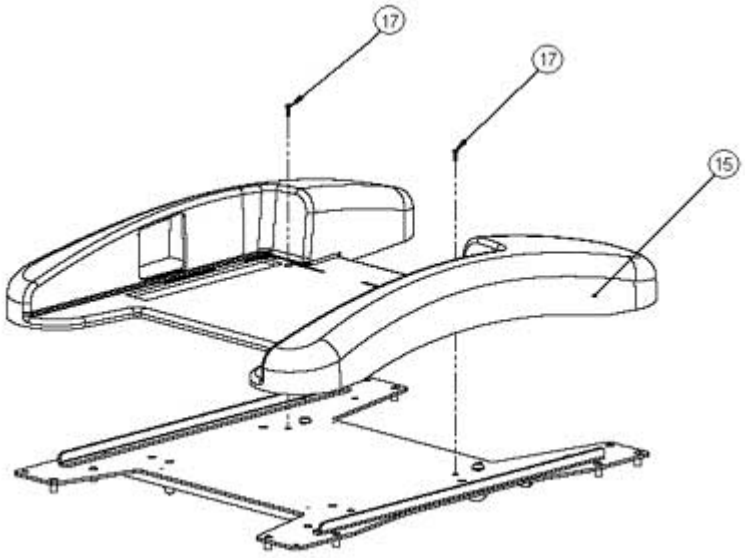
6. On the Left and Right Structures, remove the three screws (10) on each side.
7. Carefully remove the Left and Right Side Plastics (11, 12). Note the lower tabs placement.
8. Carefully remove the Front Plastic (13). Note the lower tabs placement.



9. Remove the four screws (16) from the bottom of the wheelbase and detach the Wheelbase Plastic (15).



10. Remove the two screws (17) and detach the Wheelbase Plastic (15).



CHAPTER 13: MAINTENANCE

13.1 INTRODUCTION

This section is intended to assist in effective cleaning and disinfections. It is also intended to protect the system and transducers against damage during cleaning or disinfections. Use the recommendations in this section when cleaning or disinfecting your ultrasound system, transducer, and accessories.

13.2 CLEANING INSTRUCTIONS

13.2.1 Cleaning the System

You should clean the display screen of the LCD display, all external surfaces of the system and the cart, cables and connectors. When cleaning your system, follow these cautions:

- Unplug the system before cleaning.
- Do not spill or spray any water on the controls, transducer connection receptacle, or transducer connector.

13.2.2 Cleaning the Fan

The system has many fans located in different areas. Fans tend to accumulate the largest amount of dust within the Ultrasound Modulo. The places to check are listed below. Please use the procedure in Section **8.4.3 Removing the Ultrasound Modulo** to help with the assembly and disassembly of the system.

- CPU Fan
- Side Fans on Chassis
- Cooling fans on Front Block.

Before cleaning the SONIX, please shutdown and unplug the system from the wall outlet. Use a vacuum cleaner to remove the dust from the side vents of the SONIX.

13.2.3 Cleaning Transducers

Transducers require proper handling, care, and cleaning. Improper transducer care will cause damage to the transducer. Transducer care includes daily inspection, daily cleaning, and disinfection whenever necessary. To clean a transducer:

Please be sure to clean and disinfect the SONIX transducers prior to use and storage. Refer to section **8.6.3** and **8.6.4** for detailed instructions on transducer maintenance, cleaning, disinfection and storage.

13.3 RECOMMENDED FREQUENCY OF MAINTENANCE PROCEDURES

The frequency of preventive maintenance performed on the system plays a key role in extending or eliminating downtime due to poor performance or unexpected breakdown. **Table 13-1** offers recommendations that must be weighed by factors like *frequency of usage* and *environmental conditions*. In every case, a frequent check of safety related items is highly recommended.

Table 13-1: Maintenance Procedure Frequency

Test/Clean	Frequency Interval SONIX	Task
Transducers	Six months	Check for cracks or bent pins
Safety	Six months	Ground impedance/leakage test
Fans - System	Six months	Check for good sir flow without excessive noise
Cart	Clean as necessary	The wheels have sealed bearings therefore no lubrication is necessary.
Electronics	Six months	Should by performed only by qualified service personnel.

13.3.1 Transducers

All Transducers may be exposed to many potentially damaging situations during use and cleaning. Regularly check them for signs of damage:

- Cracks on the handle
- Cracks on the nose piece
- Cuts or gouges on the lens material
- Swelling of the lens material
- Cracks or other signs of damage to the connector
- Bent or damaged pins on the connector
- Integrity and flexibility of the cable

13.3.2 Handling Transducers

Cautions:

DO NOT drop the transducer. Dropping or striking a transducer against a hard surface can damage transducer elements, the acoustic lens and electrical safety features.

DO NOT use a cracked or broken transducer. Damaged transducers present a danger of electric shock.

DO NOT pinch or kink the transducer cable. If the transducer housing becomes cracked or broken or if there are cuts or openings in the cable, the electrical safety features of the transducer could be compromised.

DO NOT immerse the external transducer beyond the first seam in any liquid. The transducer is not watertight. Immersing it beyond the first seam can destroy its electrical safety features.

13.4 ERGO ARM TIGHTENING SX1.0

Note: *Refer to the System Label on the lower left side of the back of the SONIX. Ergo Arm tightening will apply only to systems with Serial Numbers beginning with* **SX1.0***.*

From continued use, the Ergo arm of the LCD display may become loose.

Tools required: Flat head screw driver
½ socket wrench or ratchet

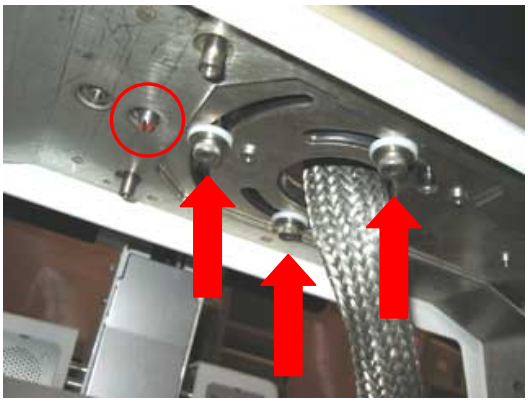
To tighten the Ergo arm:

1. Carefully pop the cover off the Ergo arm mount using a flat head screw driver. Be careful not to scratch the plastic.

2. Tighten the bolt using a ½ socket wrench. Tighten depending on how much you want the LCD display to move.

13.5 CONSOLE MOUNT TIGHTENING (SONIX SP)

1. Remove the Left and Right Inner Console support plastics as per section **12.3.1**.
2. Tighten the three bolts until the white washers do not move from side to side.
3. You may also want to either loosen or tighten the indexing screw encircled below. The indexing screw controls the clicking each time you move the Console left and right.



CHAPTER 14: TROUBLESHOOTING

14.1 SYSTEM NOT POWERING UP

To check power to system:

1. Ensure AC Main (Power Plug) is plugged in.
2. Ensure Voltage Selector/EMI Filter is adjusted to regional setting. Eg. North America = 110 – 125V, China = 220 – 240V, etc.
3. Ensure the EMI Filter is in the ON state.
4. Finally, contact Ultrasonix for further instructions to power up system.

To check the fuse:

1. Ensure the system is completely turned off.
2. Use a screw driver to open the fuse box lid.
3. Use a screw driver to take out the fuse box.
4. Replace the 2 fuses on both sides of the fuse box.

Note: *Ensure the fuse type is: 3AG Slo-Blo, 7A/250V*

14.2 NO PRIMARY HARD DRIVE DETECTED

Check the cables of the SONIX System by removing the Ultrasound Modulo from the system and open the Front Block door. See section **8.4 Ultrasound Modulo Servicing** to remove the Ultrasound Modulo and to open the Front Block door to access the hard drive.

14.3 SONIX MACHINE SEEMS SLOW

DICOM may be turned on even though it is **not** configured. ***Print Keys***, ***DICOM Settings*** and the ***DICOM Queue*** will all need to be checked to ensure that DICOM is not enabled.

14.3.1 Check the Print Keys

1. Press the console **MENU** button.
2. Select ***Admin… -> Print Keys***.
3. Check ***Print 1***, ***2*** and ***3*** to ensure DICOM is not selected.
4. Check ***OK***.

14.3.2 Check the DICOM Settings

1. Press the console **MENU** button.
2. Select ***Admin… -> DICOM.***
3. Check to ensure none of the ***Turn on DICOM…*** options are selected.
4. Check ***OK***.

14.3.3 Clear the DICOM Queues

1. Press the console **MENU** button.
2. Select ***Admin… -> Service***.
3. Enter the ***Service Password***.
4. In the ***Service*** Window, beside Windows Explorer, click ***Go***.
5. Go to ***D:\PateintInfo.***
6. Look for the files *dcm_storage_queue.xml* and *dcm_print_queue.xml.*
7. Right click on these two (2) files using the ***Update*** key and click on ***Delete***.
8. Reboot the machine.

14.4 CD/DVD DRIVE NOT RECOGNIZED

The CD/DVD drive used by the SONIX is a Panasonic UJ-845-B. It can accept the following formats: CD-R, CD-RW, DVD+R, DVD-R, DVD±RW.

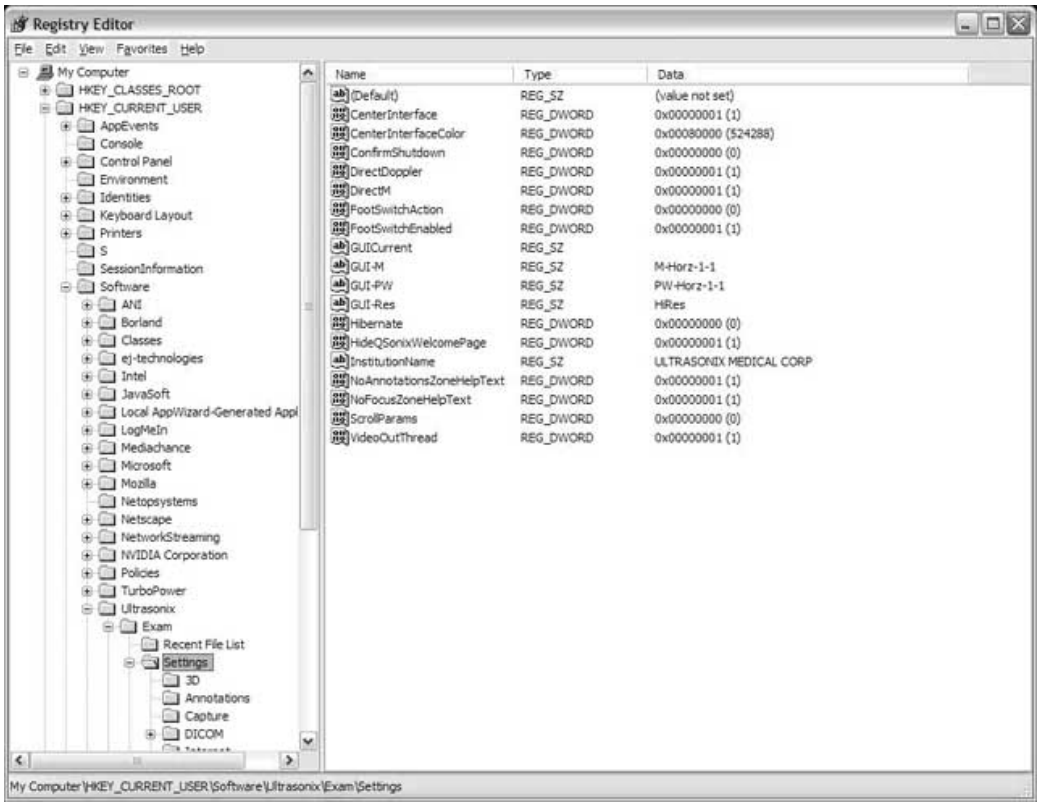
1. Flip the top panel and unplug the USB connections form the Ultrasound Modulo.
2. Power up the SONIX.
3. Plug the USB connections.
4. The CD/DVD drive should now be recognized.
5. Restart the SONIX.

Contact an Ultrasonix Technical Support Representative if you are still having trouble with your CD/DVD drive.

14.5 REGEDIT

You may need to change some settings in the registry.

1. To get to the registry, click on the Windows **START** key on the USB keyboard.
2. Click on ***Run***.
3. Type ***regedit*** and press **ENTER**.
4. In the registry, go to ***HKEY_CURRENT_USER > Software > Ultrasonix > Exam > Settings***.



Note: *Make the necessary settings changes here when advised by an Ultrasonix Technical Support Representative.*

14.6 HARDWARE TEST SOFTWARE

The Hardware Test Software can only be used with the software version it came with.

To test the Hardware:

1. Obtain a USB keyboard
2. Plug in the USB keyboard.
3. Power on the SONIX.
4. Put the system into ***Service Mode***.
5. Press **ESC** to exit the exam.

Note: *If this does not shutdown the software, use* ***CTRL-ALT-DEL*** *and* ***Task Manager*** *to end the Exam application.*

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6. Press the Windows **START** key on the USB keyboard.
7. Open ***Windows Explorer*** (***Programs > Accessories > Windows Explorer***).
8. Open ***Notepad*** (***Start > Programs > Accessories > Notepad***).
9. To switch between the ***Exam***, ***Notepad***, and ***Windows Explorer***, use the **ALT** + **TAB** key combination.

Note: *Hold down the* **ALT** *button and press* **TAB** *as many times as necessary to move to the desired program.*

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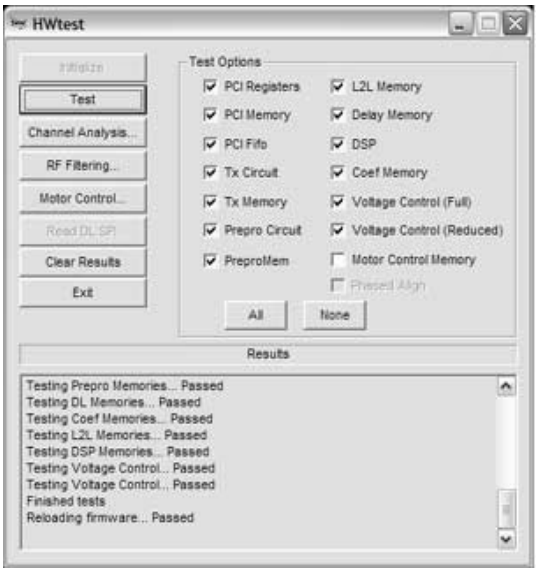
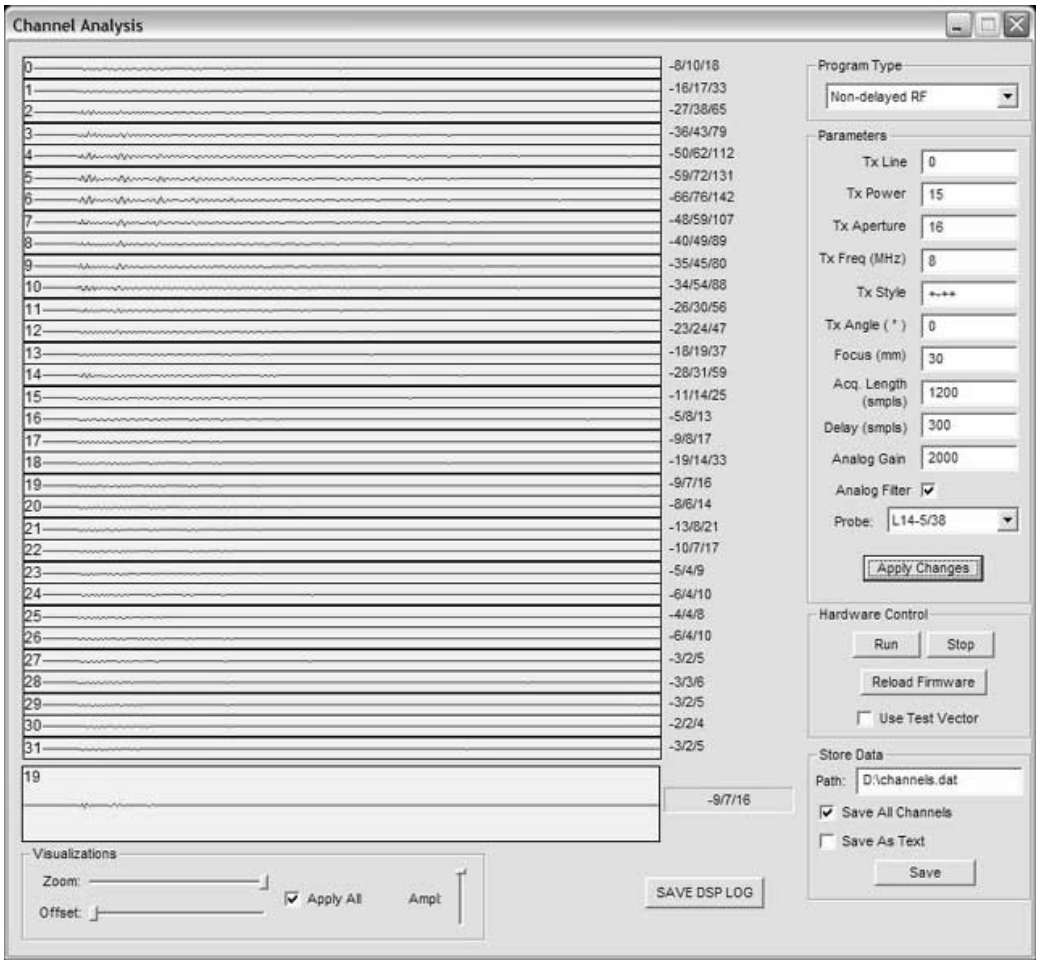
10. In ***Windows Explorer***, go to *C:\Program files\Ultrasonix\Exam* and double-click *Hwtest.exe*.
11. Click ***Initialize*** and wait for the results.



12. Click ***Test*** and use the trackball to highlight the text in the results box.
13. Point to the top left corner of the logs, hold down the **SELECT** button and move the trackball to the bottom. The logs should now be highlighted in gray.

14. Press **CTRL + C** to copy.
15. **ALT** + **TAB** to the Notepad program and press **CTRL + V**.
16. Save the logs via ***File > Save As***, naming it appropriately.
17. Select ***Channel Analysis***.
18. To check for dead crystals, slightly dip the head of the probe in a bowl of water. DO NOT go past the first seam.
19. Set ***Gain*** to 2000 and ***Delay*** to 300.



20. If there are dead crystals, the line will be flat and non-moving. The Tx line can be changed every 30 (it ranges from 0 to 127).
21. Click on ***Apply Changes***.
22. Record and save the findings in ***Notepad***, then send the file to an Ultrasonix Technical Support Representative.

14.7 LCD DISPLAY IS BLANK, TOUCH SCREEN DISPLAYS CORRECTLY

14.7.1 Check the LCD Display Power Source

If the SONIX is powered up with the LCD display unplugged, it may not display properly and will be blank. After approximately 2 minutes, the touch screen will display correctly. Either ***OK***, ***End Exam***, the ***B*** tab or the ***Presets*** tab will be displayed. Even after repeated restarts, the LCD display will still be blank. There are two options to try when this occurs.

Option 1: To reset LCD Display Factory Defaults:

1. Press **SHIFT** + **Fn** + **J** simultaneously on the keyboard to reset the display setting to the factory defaults.

Option 2: To obtain help from an Ultrasonix Technical Support Representative:

By following the steps listed below, a temporary video connection can be made to enable an Ultrasonix Technical Support Representative to help restore the display settings.

1. Locate a television with an RCA cable.
2. Plug the RCA cable into the TV's Video input connector.
3. On the SONIX, open the top, flip panel.
4. Locate the video splitter connected to Port 13 (refer to **Figure 3-2: Connectivity Panel (SX1.0)**, **Figure 3-3: Connectivity Panel (SX1.1)** and **Table 3-9: Connectivity Panel Connections** for details on this connection).
5. Disconnect the video splitter's blue or green connector from the SONIX's RCA plug.
6. Reconnect this RCA plug with the RCA cable (yellow) from the television.

14.8 LCD DISPLAY IS BLANK, TOUCH SCREEN DISPLAYS ULTRASONIX LOGO ONLY

Option 1: To ensure the Trackball and Mouse ports are properly connected:

1. Press a key on the console to determine whether or not the SONIX will begin the boot process.

   Note: *If the boot process continues, the keyboard and mouse plugs may have been interchanged.*

2. On the SONIX, open the top, flip panel.
3. Check Port 1 (trackball) and Port 2 (keyboard) to ensure that the correct wires from the console are plugged into the correct ports (refer to **Figure 3-2: Connectivity Panel (SX1.0)**, **Figure 3-3: Connectivity Panel (SX1.1)** and **Table 3-9: Connectivity Panel Connections** for details on this connection).

Option 2: To ensure there is no interference from a USB device:

It’s possible an error detecting the USB devices has interrupted the boot process.

1. Unplug all USB connections and reboot the SONIX.

14.9 LCD DISPLAY WORKS, BUT TOUCH SCREEN STILL DISPLAYS ULTRASONIX LOGO EVEN IN IMAGING MODE

Option 1: To ensure the Serial Cables are properly connected:

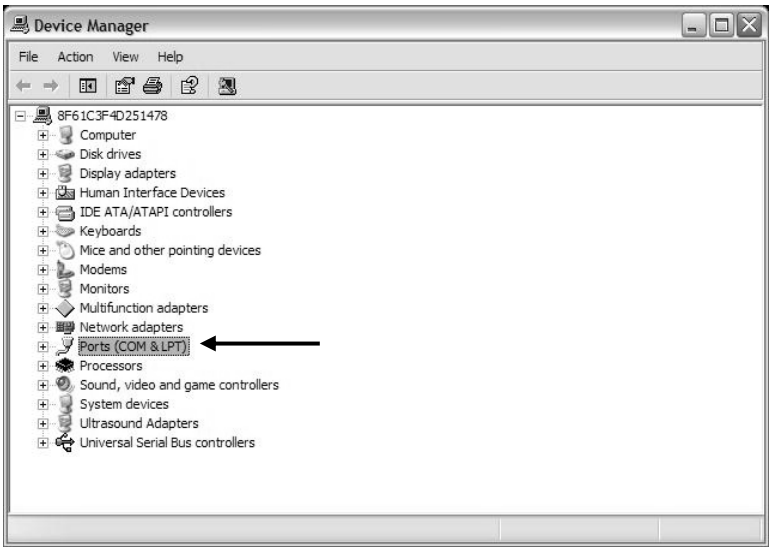
1. Shut down the SONIX.
2. Unplug, then re-plug both serial cables (refer to **Figure 3-2: Connectivity Panel (SX1.0)**, **Figure 3-3: Connectivity Panel (SX1.1)** and **Table 3-9: Connectivity Panel Connections** for details on these connections).
3. Double-check that the cables are securely connected.
4. Re-boot the SONIX.

Option 2: To ensure the Serial Expansion Card Driver is correct:

1. Press the console **MENU** button.
2. Select ***Admin… -> Service***.
3. Type in the ***Password*** and press the console **SELECT** button.
4. From the ***Service*** page, select ***Windows Explorer*** and press ***Go***.

5. From the left hand menu, right click ***My Computer*** and select ***Properties > Hardware > Device Manager***.

6. Make sure ***Ports (COM & LPT)*** is not marked with a yellow and black exclamation mark.



7. If there is a yellow and black exclamation mark next to ***Ports (COM & LPT)***, contact Ultrasonix Technical Support.

14.10 SONIX DOES NOT BOOT, ERROR IS DISPLAYED ON THE SCREEN

If the SONIX does not boot and the following message is displayed on the LCD Display "***Windows cannot boot up and a file is corrupt***" the system may prompt for a "Safe Mode" or normal boot.

If, after several attempts to boot in "Safe Mode", the SONIX restarts and simply goes back to the same screen, the operating system may have been corrupted and a System Recovery will need to be performed.

Please locate the System Recovery CD which came with the SONIX and ***contact Ultrasonix Technical Support for further instructions***.

Caution:	*Do not attempt a System Recovery without first consulting an Ultrasonix Technical Support Representative.*

14.11 SONIX FREEZES DURING USE

If, periodically, the SONIX freezes during use and there is no pattern to this behavior, it may be necessary to test the RAM.

Please check the RAM chips using a RAM software tester to determine whether any are defective. Replace the RAM in pairs.

Notes